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Business Cycle Indicators: The Known and the Unknown

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BUSINESS CYCLE INDICATORS - THE KNOWN AND THE UNKNOWN¹

by

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TABLE OF CONTENTS

	Page
1. Introduction	361
2. Explanations of the Business Cycle	363
3. Leading, Coincident and Lagging Indicators	365
4. Analytical Measures	369
5. Summary Measures	372
6. Known and Unknown	376
7. Appraising Cyclical Trends at Different Cyclical Stages	378
8. Merits and Limitations	380
Bibliography	382

1. INTRODUCTION

During the past few years business indicators have been more and more widely used by business and academic economists in diagnosing current business conditions and forecasting short-term trends. Newspapers and magazines report on the progress of "leading" and "lagging" series periodically. High government officials, including the President himself, follow the course of these series. Thus in a press conference held on July 5, 1962 President Kennedy was asked the question, "Could you spell out a little bit the formula that you will use to make the decision whether you will ask a tax cut this year or not . . ."

The President responded, ". . . we will look at the indicators, the basic indicators which have had some historical significances in previous years as indicating . . . a prognosis for the economy."

There is a great deal of scattered knowledge about business cycles in the popular press and a detailed account can be found in the technical literature. This paper attempts to bring together an account of what is known about business indicators, what are the problems of using them, and what research is needed to improve their usefulness.

There are, of course, other approaches to the study of business fluctuations,

¹ A review paper prepared for the 34th Session of the International Statistical Institute in Ottawa Canada, 1963.

NOTE: The writer is under heavy obligation to many persons for suggestions and advice in the preparation of this paper. Especially helpful were the following members of a committee appointed by the American Economic Association to advise the Bureau of the Census on the monthly publication *Business Cycle Developments*: Bert Hickman (chairman), Donald J. Daly, Gottfried Haberler, John P. Lewis, Geoffrey H. Moore, Frank E. Morris, Arthur M. Okun, Beryl W. Sprinkel, and Lorman C. Trueblood. In addition, A. Ross Eckler and Herbert N. Blackman of the Bureau of the Census and Roy L. Lowry of the Federal Statistics Users' Conference made important contributions. However, the views expressed in this paper are the author's and not necessarily those of the U.S. Bureau of the Census or any person listed above.

with different merits and limitations; for example, the econometric model approach, through which forecasts of gross national product and its composition can be made mathematically on the basis of the historical relations between consumption, private investment, government and various components of these major aggregates. The stakes involved in accurate forecasts of business and business fluctuations, particularly recessions, are so great that the country cannot afford to neglect any approach which offers some hope of success.

It is most convenient to present the available knowledge about business indicators around *Business Cycle Developments*, a monthly publication of the Department of Commerce. This report presents data, in charts and tables, for a large number of economic time series arranged so as to maximize their usefulness for business cycle studies. It contains data on the current state and recent experience of the economy in a form designed to aid students of business conditions. These data are the record of the past and are not in themselves an appraisal of the future. But they constitute some of the vital raw materials from which judgments about the economic outlook are fashioned.

In its selection of data and in grouping data analytically, *Business Cycle Developments* follows the economic indicators approach to business cycle analysis which has been developed over the years largely by the National Bureau of Economic Research in New York. A brief description of this approach and the statistical measures used is given in the introduction which appears in *Business Cycle Developments* each month².

It may be helpful at the outset to provide some perspective on the usefulness of the indicator approach through the following two quotations by prominent students of the business cycle.

1. "My overall judgment would be that their judicious use does provide a valuable addition to the forecasters' tool box. The indicators have been of some help in every post-war cyclical turn, but have been more helpful in some than in others. They have also given some false signals." (Professor R. A. Gordon, University of California, "Alternative Approaches to Forecasting," *The Review of Economics and Statistics*, August 1962).
2. "In conclusion, the . . . statistical indicators, like most other tools of economic analysis, probably have considerably more merit than their most uninformed critics see and probably more limitations than their most ardent advocates like to recognize. The difficulties in applying the indicators to forecasting on a current basis . . . should demonstrate that these indicators do not provide a certain and easy method of forecasting. They have not brought automation to forecasting; and they do not threaten the professional judgment of economists with technological unemployment. However, I believe that the postwar experience does show that, properly used, the indicators can be a very valuable tool for the forecaster." (Frank E. Morris, *Proceedings of the Business and Economic Statistics Section*, American Statistical Association, September 11, 1957).

² Further background on the approach and fuller explanations of the measures used in the monthly report may be found in *Signals of Recession and Recovery*, by Julius Shiskin issued in October 1961 by the National Bureau of Economic Research, New York (Occasional Paper No. 77). See also Arthur F. Burns and Wesley Clair Mitchell, *Measuring Business Cycles*, New York, National Bureau of Economic Research, 1946, especially Chapter 1; Wesley C. Mitchell, *What Happens During Business Cycles*, New York, National Bureau of Economic Research, 1951; and *Business Cycle Indicators*, Geoffrey H. Moore, editor, Volume I, 1961. This paper is based upon material provided in these sources. For reference to other studies of business cycles, see these sources and the bibliography at the end of this paper.

2. EXPLANATIONS OF THE BUSINESS CYCLE

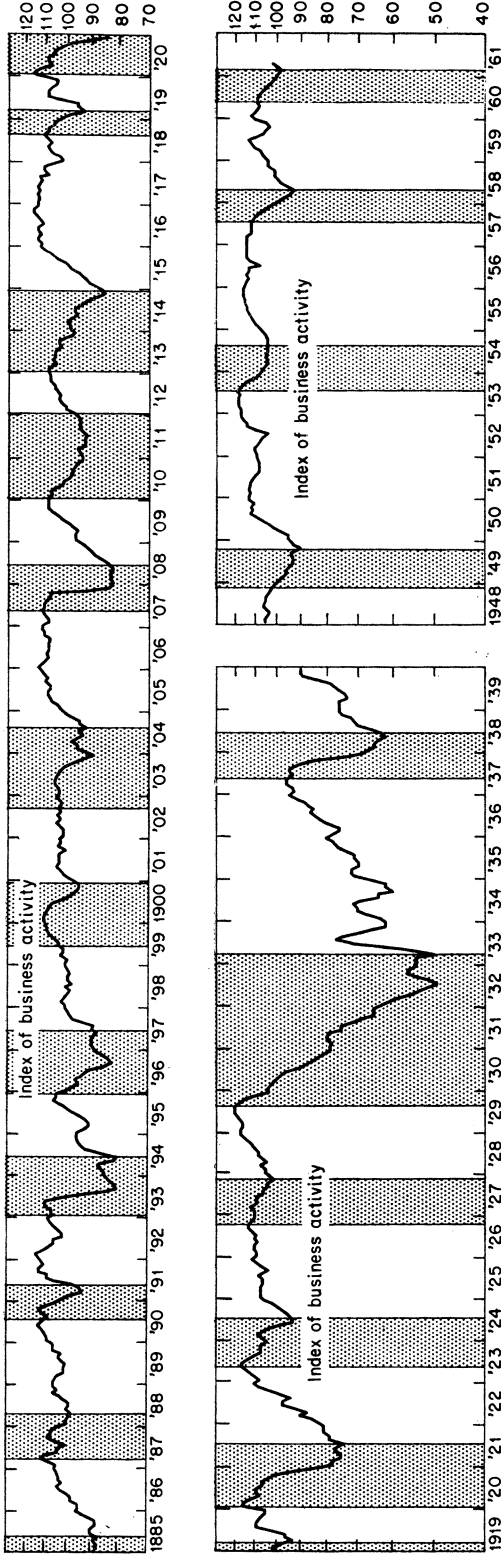
The "business cycle" concept has been developed from the sequence of events discerned in the historical study of the movements of economic activity. Though there are many cross currents and variations in the pace of business activity, periods of business expansion appear to cumulate to peaks. As they cumulate, contrary forces tend to gain strength bringing about a reversal in business activity and the onset of a recession. As a recession continues, forces making for expansion gradually emerge until they become dominant and a recovery begins. This pattern of expansion and contraction may be seen in the following chart of an index of business activity covering the years 1885–1961 plotted against the background of the reference cycles. The regularities as well as some of the irregularities of the pattern are evident from the chart.

Monthly business cycle peaks and troughs have been dated by the National Bureau of Economic Research for the period 1854–1961. Over this span expansion has prevailed 61 percent of the time and recession 39 percent. If war periods are disregarded, expansion has prevailed 56 percent of the time and recession 44 percent. A recession free society is one of the major goals of economic policy. But in view of this historical record, it is prudent to take the possibilities of recession into account in considering short-term economic prospects.

Though the recurrence of successive waves of business activity is generally acknowledged, many different explanations of the underlying causes for these business fluctuations have been advanced. Some economists lay primary stress on the role of investments in inventory and fixed capital. Others emphasize the central role of the supply of money and credit and the interest rate. Still others look for clues in the relations among prices, costs and profits. All of these factors undoubtedly influence the course of business activity, and some are more important at some times than at others, but there is no general agreement as to which are usually more crucial to the process. The *Business Cycle Developments* report provides data bearing on all, or most, of these factors. The analyst using the report must therefore exercise his own judgment as to the state of the economy, using those measures which he considers most significant.

For purposes of illustration, it may be useful to summarize one view of the sequence of events during a business cycle, that espoused by the late Wesley C. Mitchell and Arthur F. Burns, leading students of business cycles. In the advanced stage of an expansion, business concerns frequently encounter obstacles to further growth. New supplies of materials and components may come into short supply; business loans may be less readily available and interest on such loans higher. Shortages of some types of labor may occur. Competitive pressures make it somewhat hazardous to raise prices, even though costs, such as wages and interest rates, tend to be rising more rapidly than in the early stages of the advance. The outlook for further expansion becomes less favorable and a "squeeze" on profits or profit rates may develop. When this occurs businessmen become more cautious and are likely to reduce their commitments for the future. As the prospects for forward profits appear to become more uncertain, investment commitments, involving inventories, new orders for machinery and equipment, and contracts for commercial and industrial construction tend to drop. Sometimes the reaction is promptly apparent in the stock market, where changes in outlook can be registered quickly. Reductions in overtime and hours of work and the closing down of marginal activities are also symptoms which may appear at this juncture.

CHART 1. AN INDEX OF BUSINESS ACTIVITY, 1885-1961



The index of business activity shown above is published by the Cleveland Trust Company and is adjusted for trend.

Note: Shaded areas represent business contractions; unshaded areas, expansion.

However, current production and employment which flow from earlier business commitments, continue to rise, often to all time highs. Actual expenditures for plants and equipment, contracts for which were necessarily made long in advance, may continue to go up even after the peak of production and employment has been passed. Thus, at the very time when forward commitments, in the form of new contracts and new orders, are being reduced and forces set in motion which may lead to a reversal in business activity, production and employment may be at full strength and plant and equipment expenditures may continue to rise for some months. However, the decisions to reduce investment commitments finally begin to affect production and employment and a decline in aggregate economic activity sets in. During a recession when facilities and supplies become more readily available, inventories tend to be low, costs often decline and as future profit prospects appear improved, a reverse movement gets underway and the forces which lead to a new expansion gradually come to the fore. In this way the effects of investment decisions by businessmen are spread over many months and among many different economic processes.

This highly generalized and oversimplified pattern is, of course, affected by international developments and by government policies and programs which in modern society play a significant role in the economy. The impact of "external" events must necessarily be considered carefully in any study of cyclical trends.

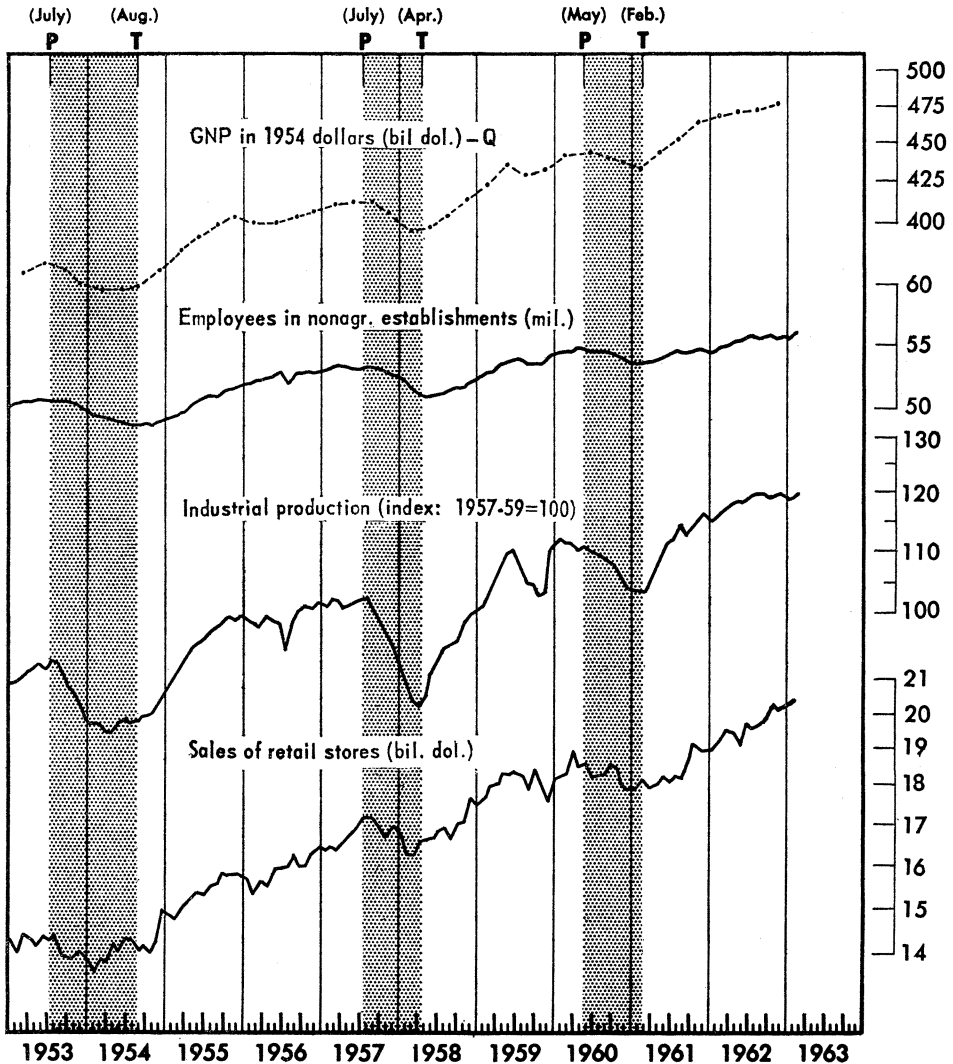
3. LEADING, COINCIDENT AND LAGGING INDICATORS

Although economists differ with regard to the relative importance of various economic indicators as prime determinants of cyclical fluctuations and the reliability of the indicators at different stages of the business cycle, there is a widespread view and much historical evidence that business indicators tend to move through the cyclical course in consistent but different time sequences. Accordingly, in the *Business Cycle Developments* report, economic indicators useful for business cycle studies are grouped into three major categories and are designated as "leading", "roughly coincident", and "lagging". This classification of the series is based upon the general theoretical framework alluded to above and upon extensive empirical tests of the performance of the series conducted since World War I primarily by the National Bureau of Economic Research of New York under the leadership of Wesley C. Mitchell, Arthur F. Burns, and Geoffrey H. Moore. Professors Edwin B. Frickey, Warren M. Persons and Joseph Schumpeter of Harvard might be mentioned among many others at universities, research organizations, and government agencies who have made significant contributions to the study of business cycle phenomena in the past.

One group of economic time series, which may be referred to as "roughly coincident," relate primarily to aggregate economic activity. This group includes such output measures as gross national product and industrial production, as well as employment, income, bank debits, retail sales and wholesale prices. The movements of these activities tend to coincide with, and in a sense, measure and define the business cycle. Several of these series are shown in chart 2.

It should be noted that the individual series do not always "coincide" precisely with each other or with the "reference" dates, that is, the dates selected as the turning points in aggregate economic activity. A composite of all the series would tend to demonstrate a more faithful "coincidence." This emphasizes the importance of studying many series rather than a few in making judgments as to the position and prospects of the economy.

CHART 2: RECENT EXPANSIONS AND RECESSIONS DEFINED BY ROUGHLY COINCIDENT SERIES



As our economy is organized, certain activities frequently foreshadow changes in the aggregate economic activities which define the business cycle. For the most part, these are measures of activities which reflect future production and employment; for example, new orders are placed, particularly for machinery and other types of equipment; contracts are let for the construction of new plants; investments in materials inventories are made and new businesses are started. Also, hours of work are adjusted and profit margins altered. Statistical measures of activities which foreshadow turning points in the business cycle are called "leading series." They are - in a manner of speaking - signals of things to come.

In contrast to these advance signals, there are some activities which have been observed to lag behind, or follow, aggregate economic activity. Some of these relate

CHART 3: EARLY WARNING SIGNALS BY LEADING SERIES

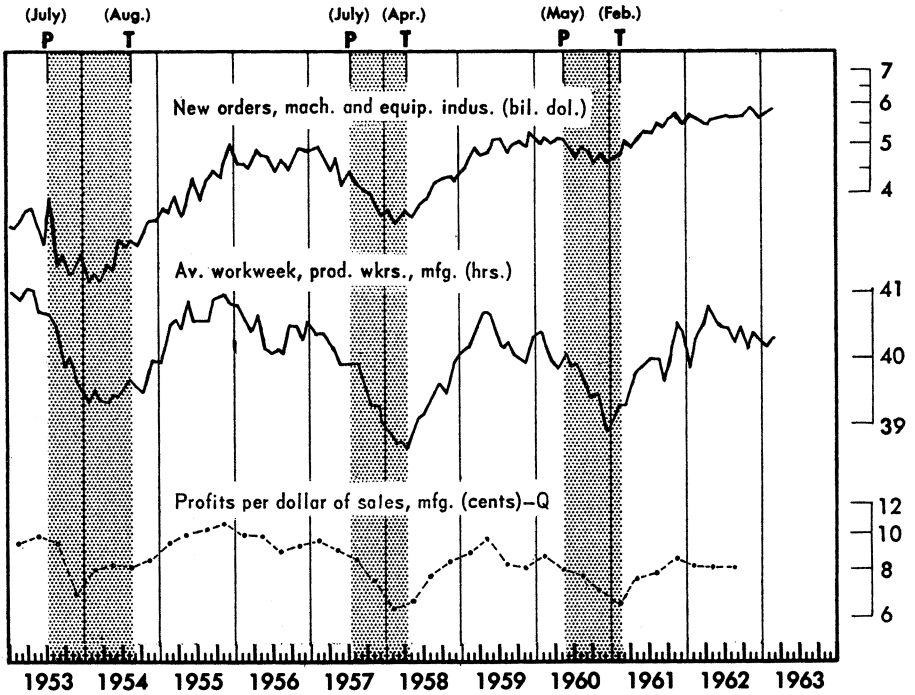


CHART 4: CONFIRMATION BY LAGGING SERIES

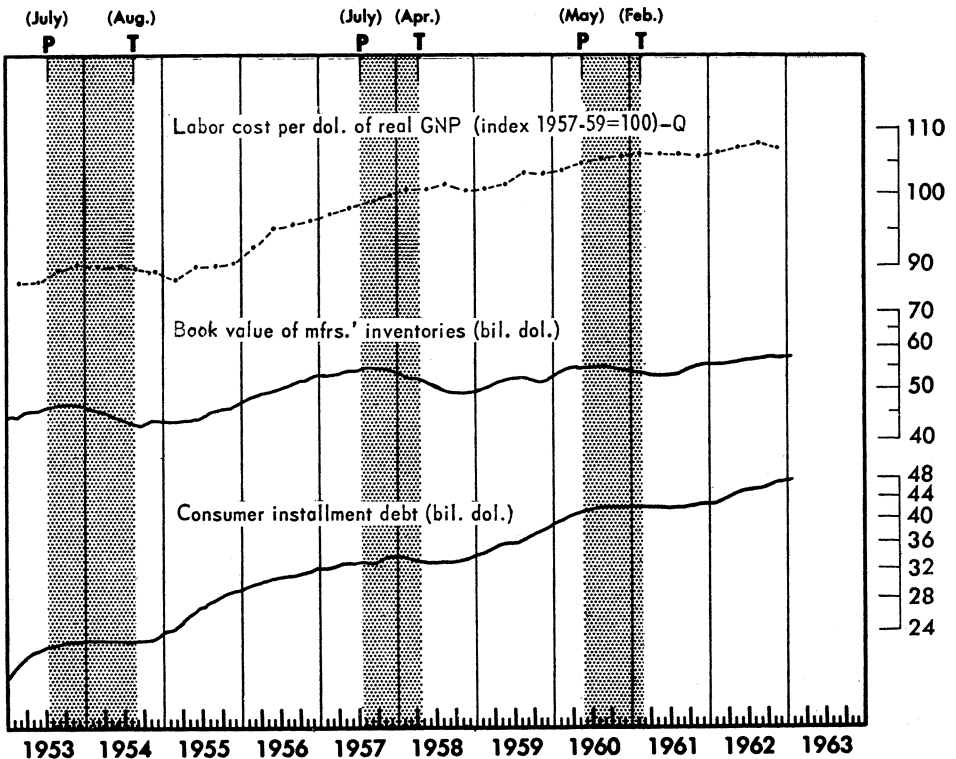
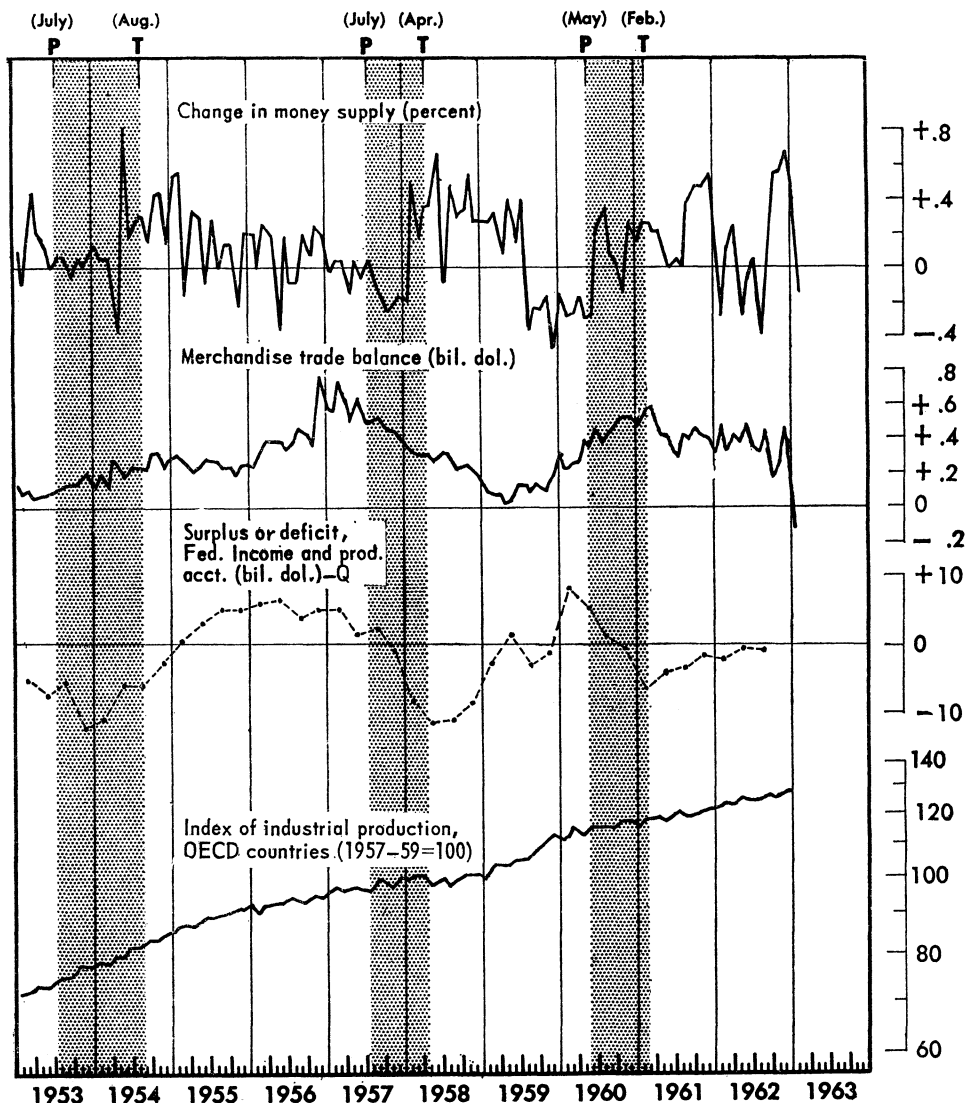


CHART 5: OTHER SERIES WITH BUSINESS-CYCLE SIGNIFICANCE



to business costs, which respond sluggishly to changing business conditions. This group includes such statistical series as labor cost per unit of output, bank interest rates, inventories of finished goods and consumer debt. Some of the "lagging" activities, in their turn, contribute to an economic climate which is conducive to opposite changes in the activities measured by the leading series. For example, as various business costs decline during a recession, there is more incentive for business to place new orders and make new capital investments. By the same token when these costs rise during the latter part of an expansion, there is pressure to reduce or postpone new business commitments, and a contraction in activities may soon begin.

In utilizing these three categories of series, it should be borne in mind that the terms "leading", "coincident" and "lagging" are short-cut expressions summarizing important economic concepts and findings of many years of empirical research.

Students of the business indicators approach state that while the sequence of events varies from cycle to cycle, it is sufficiently orderly so that it is possible to make judgments about the pattern of the next stage of the cycle from developments during a given cyclical phase. The arrangement of the series in the *Business Cycle Developments* report is aimed at assisting in this process. But in order to improve our judgments, it is essential to examine certain other measures of economic activity which do not behave in a manner sufficiently consistent to be easily classified into one of the three foregoing groups. A number of such series are shown in the report including data relating to the rate of change in the money supply, consumer prices, Federal cash surplus or deficit as reflected in the balance of receipts and payments, military obligations, foreign trade and the balance of international payments. Most of these do not move up and down with the business cycle in an orderly and repetitive fashion. Indeed some represent exogenous factors which distort the normal course of the business cycle and suggest forces which may be harnessed to control it. Additional background information is provided by inclusion of production indexes for the principal industrial countries with which the United States trades. The publication of these other series in *Business Cycle Developments* is an implicit acknowledgement that the leading, coincident and lagging indicators by themselves comprise an incomplete tool for current business analysis.

4. ANALYTICAL MEASURES OF CURRENT TRENDS

As a further aid to understanding current and prospective business conditions, *Business Cycle Developments* contains various analytical measures which are designed to show how widespread and how fast are the movements through the economy.

Generally, the scope narrows and the rate of change declines in the late stages of expansion and contraction. This knowledge about business cycles is taken into account by diffusion indexes and rates of change. These measures are closely correlated. Diffusion indexes show how widespread a recession or recovery is, whether it is continuing to spread, and are helpful in judging the effects of policies and developments that are likely to make it spread still further. On the other hand, rates of change indicate the magnitudes of change over different cyclical stages and different cycles. Diffusion indexes are occasionally somewhat smoother, particularly in periods of abrupt changes as, for example, during strikes.

Diffusion indexes show the percentage of companies, industries, or geographic areas which are experiencing rises over the time interval measured (see BCD Table 4). For example, of 30 industries measured, about 63 % had increases in employment (apart from seasonal movements) in June 1962 compared with May 1962. In July 1962, some 48 % of the industries experienced rises in employment. The diffusion indexes thus measure the scope or breadth of a fluctuation in total activity. Widespread increases are often associated with rapid growth in aggregate activity and widespread declines with sharp reductions. A rapid decline which is widespread is more likely to be cyclically significant than one of narrow scope. The diffusion indexes are useful predictive tools because they almost always reach their highs and lows before the highs or lows in the corresponding aggregates,

frequently leading by 6 months or more. Diffusion indexes are also helpful to an understanding of business conditions because they make clear that there is rarely a period, either during expansions or recessions, when business activities are all moving in the same direction. Some cross currents are to be expected at all times. The activities that are moving counter to the general tide often provide a clue to the eventual reversal of the tide. Finally, certain types of diffusion indexes show how widespread a rise in sales or orders was expected by businessmen to be, as compared with how things actually turned out. Hence they show current opinion as to the state of business, and sometimes reveal widespread errors of optimism or pessimism (BCD Table 5).

Certain series, which represent rates of change (e.g. initial claims for unemployment insurance and inventory investment) are used as leading indicators. In addition, a tabulation of "Rates of Change" for the principal 72 business indicators shows how fast business is expanding or declining from month to month (see BCD Table 2). It provides a quick summary of current movements of the key indicators. The average monthly change from 1948 to 1961 is also given for each series to provide a perspective against which to judge recent changes. It should be noted that, as in the case of the diffusion indexes, month-to-month percentage changes are frequently erratic in their behavior.

The "direction of change" table (BCD Table 6) shows by pluses and minuses which economic activities went up, which went down and how long such movements have persisted. They are additional guides which indicate, in depth, how a recession or recovery spreads from one sector of the economy to another.

Finally, the cyclical patterns section of *Business Cycle Developments* includes charts and tables which compare the behavior of the indicators in the current business cycle phase with their behavior during the corresponding phase of previous business cycles. For example, comparisons are shown of the movements of series from previous business cycle peaks (reference peak levels); similar comparisons are shown of the movements of series from their previous cyclical low points (specific trough levels). Such data are helpful in placing a current movement in the historical perspective of previous cyclical developments.

CHART 6: DIFFUSION INDEXES

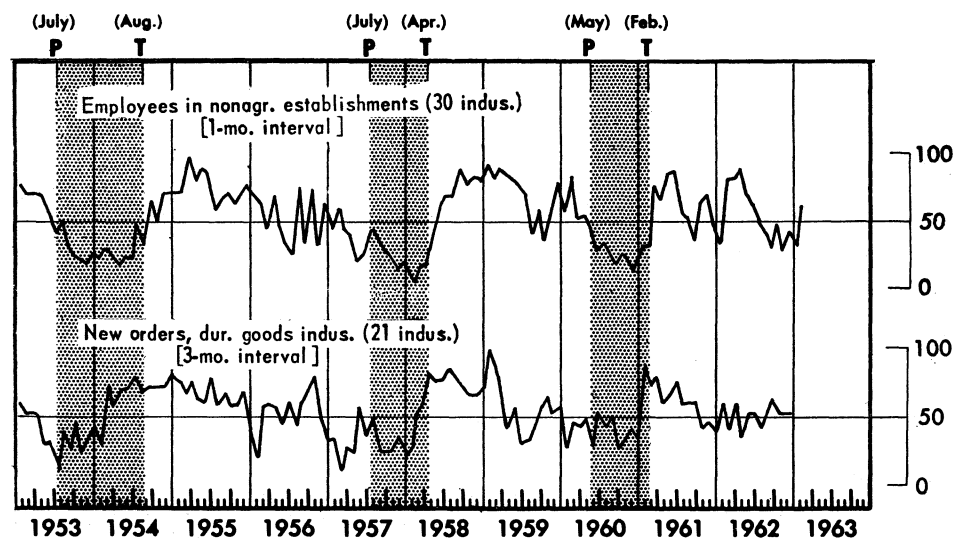
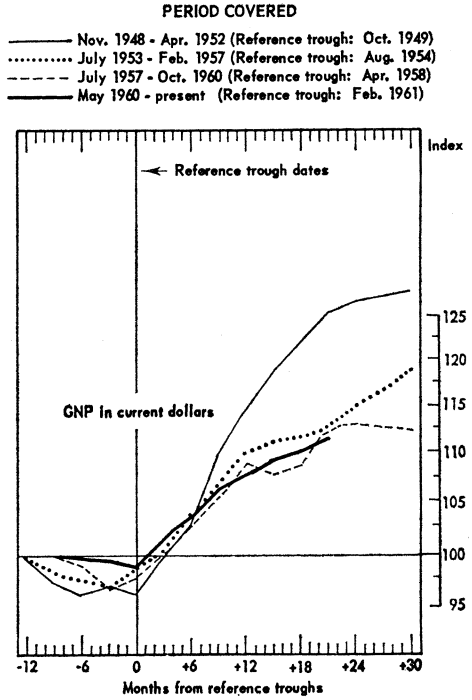
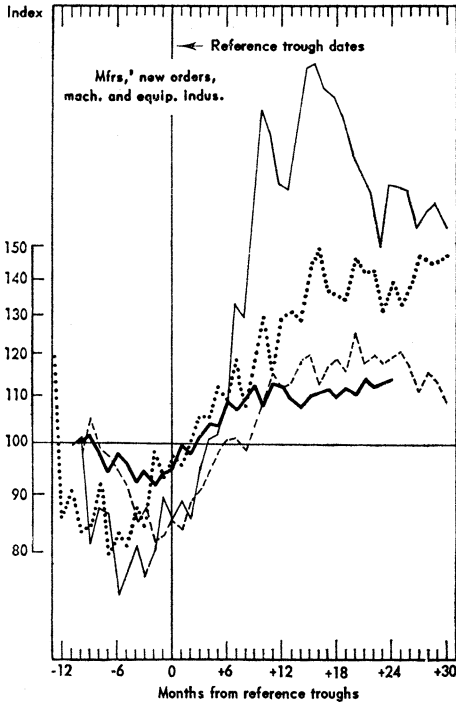


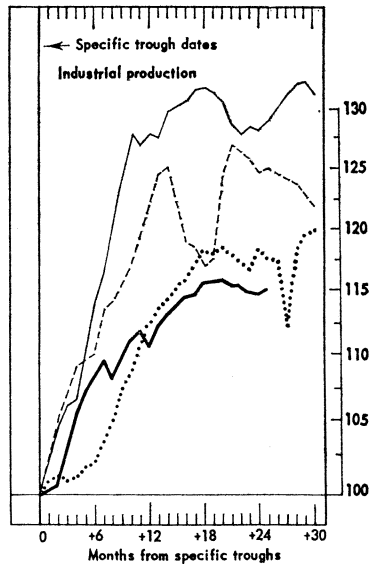
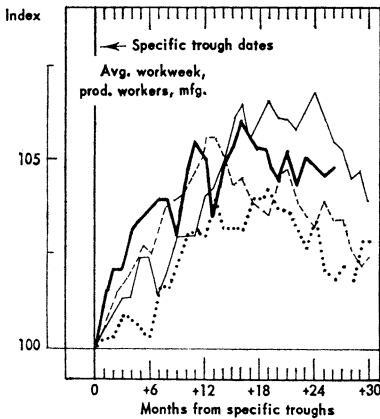
CHART 7: COMPARISONS OF BUSINESS-CYCLE PATTERNS



PERIOD COVERED

From specific trough dates to 30 months later. Specific trough dates are the dates each series actually begins the expansion identified with the reference trough of--

1949 ———	1958 - - -
1954	1961 ———



5. SUMMARY MEASURES

In studying the current economic situation, there is always a conflict between examining a wide variety of aspects of the economy, so as to be sure that all the relevant points are covered, and examining a few selected indicators so that it is easy to grasp the overall trends. Most business analysts move back and forth from a detailed examination of many sectors to a broad view of the overall situation, and there is a feedback of information and insight from one view to the other.

The summarization of the large variety of data to highlight business cycle developments involves combining different kinds of economic series. Some such summaries, such as GNP in current and constant dollars, are widely used. But for the most part such summary measures cover only one aspect of economic activity, such as production, or prices, or income. It is appropriate to ask whether there is a conceptual basis for a broader type of summary which would combine different economic processes in a meaningful way.

Business cycles are characterized by coordinated movements among many diverse sectors of the economy, (e.g., production, employment, money flows, inventories, and prices) but not all (e.g., agricultural output). In order to provide a composite picture helpful in formulating a judgment about the overall performance of those sectors of the economy which do experience cyclical fluctuations, a broad but nevertheless selective type of summary is needed. Activities such as production, employment and prices, are heterogeneous in the sense that they cannot be added to any meaningful total. They are homogeneous, however, in the sense that they measure related aspects of business change, and undergo similar cyclical fluctuations. The combination of series measuring different economic processes provides a single measure of the complex of economic activities which experience business cycle fluctuations. For this reason, it is appropriate to combine them for business cycle studies (though not for certain other purposes, such as measuring long-term growth). Many students of business cycles have utilized such combinations, for example, Wesley C. Mitchell and Arthur F. Burns at the National Bureau of Economic Research and Edwin B. Frickey of Harvard University. Statements involving a crude concept of this sort, such as that recession is "widespread" or that "all the indicators are moving up," are frequently found in the daily press.

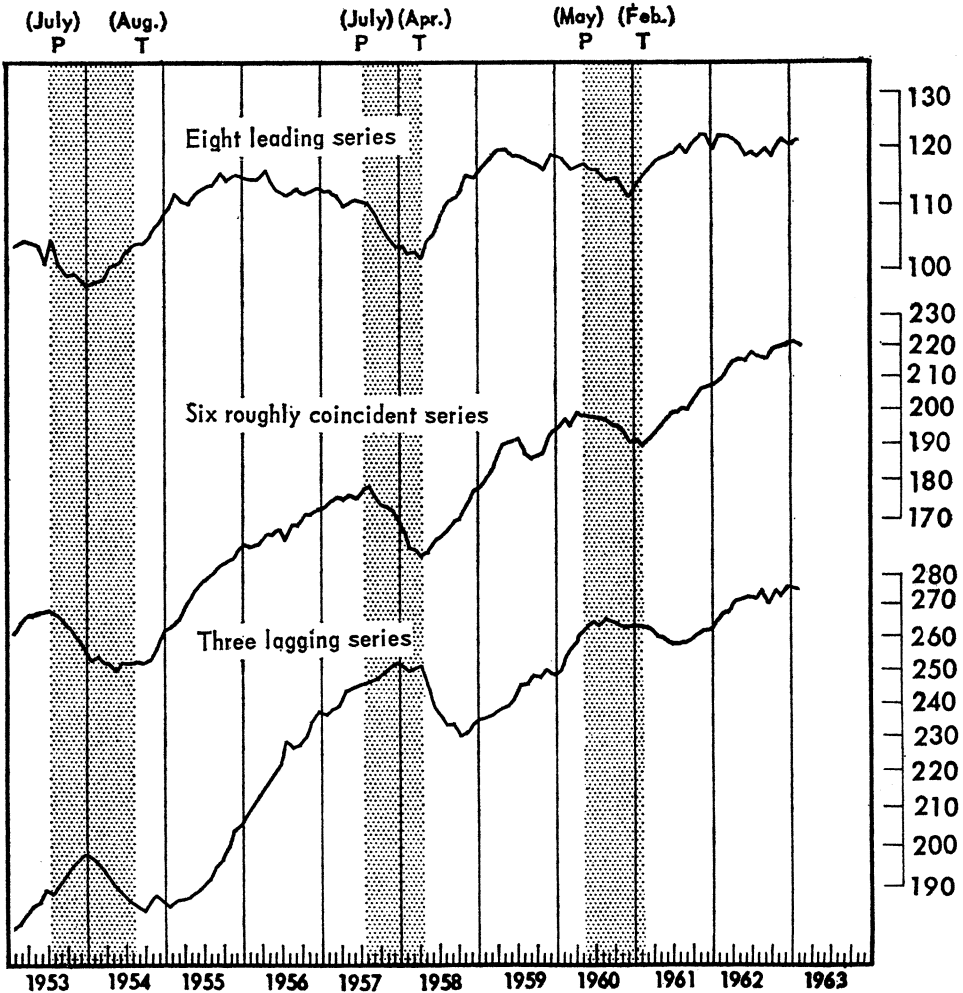
There are various ways of summarizing the data on business cycle developments. Of the different types of summaries that we have constructed for experimental purposes, each shows the overall cyclical pattern in a somewhat different light, and each has different merits and limitations. There probably is no one best way of summarizing the information and no single summary measure is ever likely to suffice for all purposes. The use of different summary measures together, and as supplements to the detailed series, is often enlightening. For example, after a decline in the comprehensive diffusion index for the leaders, one would look for confirmation to a decline in the diffusion index for the coincident series and in the general index for the leaders. If these take place, one would watch for a decline in the general index for the coincident series. While there are always some irregularities in the movements of these series, the use of all of them together, along with the component series from which they are constructed, makes possible a more reliable judgment on underlying cyclical trends.

These separate types of summary measures (a) highlight the cyclical timing and pattern of business cycles, (b) measure their scope, and (c) provide clues to the current vigor of cyclical forces. They are more useful when the individual series

are classified according to their cyclical timing. Separate compilations have therefore been constructed for series which have in common a tendency to lead, for series which measure different aspects of aggregate economic activity and are used to determine business cycle turning points (roughly coincident) and for series which have a common tendency to lag. Each such combination provides a measure of the performance of a different phase of the decision making processes which result in the business cycle. These combinations contribute a composite picture of the economy as it moves through expansion and contraction.

a. *Amplitude-Adjusted Composite Indexes.* The summary measures referred to as "amplitude-adjusted" composite indexes are constructed by standardizing the month-to-month percentage changes of each series so that all the series are expressed in comparable units. To do this each series is adjusted so that its average month-to-month change, without regard to direction, is *one*. This method facilitates the interpretation of the current month's change both with respect to earlier periods and other series. The individual amplitude-adjusted series are

CHART 8: COMPOSITE INDEXES - WEIGHTED



weighted and combined into an index. This index is also adjusted so that its average month-to-month change is *one*. The amplitude-adjusted indexes provide a composite measure of the amplitude and pattern of the business cycle, readily interpreted currently. For example, if the index shows an increase in the current month of 2.0, this means it is rising twice as fast as its average rate of change in the past; if the increase is 0.5 it is rising only half as fast as the historical average.

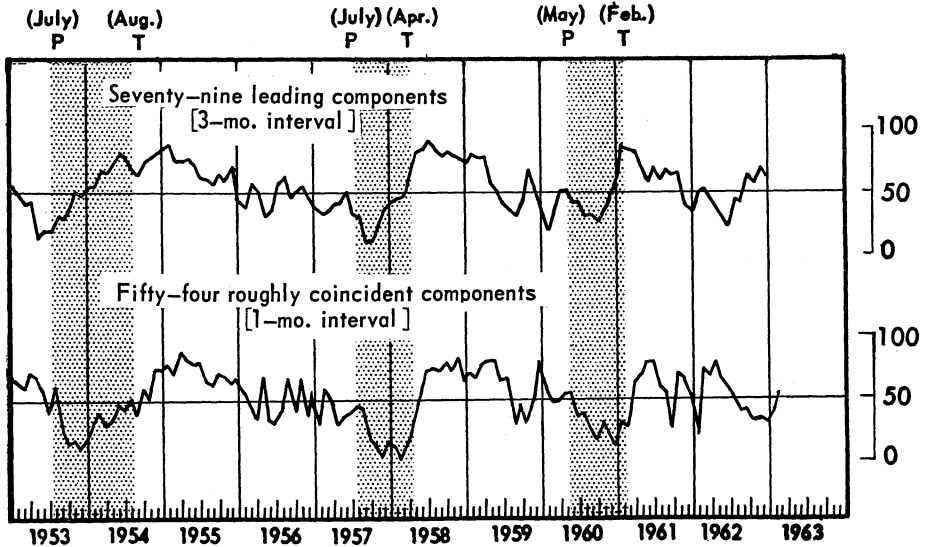
A substantial number of general indexes have now been constructed. For the leading series, a weighted index of 8 principal indicators has thus far been most frequently used. A second index of 12 different leading series moves very similarly, and adds support to the view that the cyclical trends in these series are due to a large variety of causes and not to isolated phenomena. An index of all 20 monthly leading series is a little smoother than either of such indexes, and has been used more often in recent months. Weighted indexes of 6 principal coincident series and 3 principal lagging series are also computed each month. The weights are the historical records of the timing and conformity of each series. Studies have demonstrated that these indexes are smoother than any of the individual series included in them and have better timing and conformity records. Studies have also demonstrated that the short-term changes in the weighted and unweighted indexes are very similar. Small differences are to be expected since the indicators were selected from more than 1,000 candidates because of their superior business cycle performance. Some of these indexes are shown in the illustrative chart.

b. *Comprehensive Diffusion Indexes.* Diffusion indexes covering a variety of economic processes make up another type of summary measure. Diffusion indexes based upon 79 leading series and upon 54 coincident series have proven useful because they reduce, though by no means eliminate, irregularities. Although many economic series are included, these indexes cover a limited number of economic processes. They have therefore been supplemented by three diffusion indexes based upon the 24 leading monthly series, 8 coincident series and 7 lagging series. This second type of comprehensive diffusion index includes fewer series, but more economic processes.

Even these comprehensive diffusion indexes are quite erratic, but they provide a useful supplement to other summary measures and to the detailed information shown in the monthly report. Suppose, for example, that the general index of the leading series has been declining for several months and that this decline is in part due to declines of some of the most reliable leading indicators such as orders and contracts for machinery and equipment, hours worked, and stock prices. The diffusion index constitutes information as to whether the movement is or is not as widespread as in other instances in the past when a recession was about to begin. A decline that is widespread is more likely to be "cyclically significant" than one that is not.

These diffusion indexes are unweighted; that is, each component is given equal weight. Conceptually, it would be better to weight diffusion indexes by measures of their cyclical performance, as in the case of the amplitude-adjusted composite indexes. This would provide a measure of the scope of a recession or recovery that would give heavier weight to processes that have had a more consistent cyclical performance in the past. However, it would be a large job to determine the weights for the most comprehensive diffusion indexes since so many series are involved. The weighted indexes would probably be quite similar to the unweighted ones, because only series which would be expected on the basis of the behavior

CHART 9: COMPREHENSIVE DIFFUSION INDEXES



of their aggregates to have good cyclical performance, are included. Consequently, it has not seemed worthwhile to go to the expense of making up the weighted indexes.

DISTRIBUTION OF HIGHS IN BUSINESS CYCLE INDICATORS DURING RECENT MONTHS
COMPARED WITH PERIODS BEFORE PREVIOUS BUSINESS CYCLE PEAKS

No. of months before benchmark date that latest high was reached	Percentage distribution of highs, when benchmark date was						
	6th month before peak	3rd month before peak	At peak	Sept. 1962	Oct. 1962	Nov. 1962	Dec. 1962
	Average: Four business cycle peaks (1948, 1953, 1957, 1960)				Current expansion		
	Twenty-three leading indicators ¹						
6 or more	52	64	77	65	74	70	69
3, 4 or 5	24	17	17	26	13	0	9
1 or 2	16	13	2	0	9	13	13
0 (high on benchmark date)	8	6	4	9	4	17	9
Total	100	100	100	100	100	100	100
	Eleven roughly coincident indicators						
6 or more	5	14	16	9	9	19	18
3, 4 or 5	27	9	36	9	27	27	37
1 or 2	30	39	21	55	18	27	27
0 (high on benchmark date)	38	38	27	27	46	27	18
Total	100	100	100	100	100	100	100

¹ Based on 18 leading indicators in 1948, 19 in 1953 and 23 from 1957 through December 1962.

c. *Timing Distributions.* "Timing distributions" of current highs or lows show the number of individual series reaching highs during each of the recent months of an expansion – or lows during the recent months of contraction. The highs or lows designated during a current cyclical phase will not necessarily be specific cycle turning points. Thus as new high levels are reached during an expansion, the current highs will be moved ahead. On the other hand, lows designated for the previous cyclical phase usually do identify specific cycle turning points. Comparisons of the current timing distributions with those for periods around earlier business cycle troughs and peaks are helpful in appraising the evidence of a prospective business cycle turning point.

Detailed timing distributions for the post-World War II expansions are shown in Table 3 of *Business Cycle Developments* each month. Various types of summary distributions can be made up from these. One that is useful is presented here.

These summary measures are still exploratory, and for this reason most are not yet included in the official Government publication, *Business Cycle Developments*. Similar measures can, however, be obtained monthly from various private organizations.³

6. KNOWN AND UNKNOWN

The study of previous cycles over the past 100 years provides the basis for the organization of data in the *Business Cycle Developments* report and for explanations of the sequence of events which permits us to make intelligent use of these data. In addition to the knowledge that has accumulated about the timing sequence of economic processes and the behavior of diffusion indexes and rates of change, certain key findings, relevant to short term analysis, emerge from studies of successive ebb and flow of business activities. These may be summarized as follows:

- a. Since 1854, peacetime business cycles have averaged about 46 months. On the average, expansions have run about 26 months and recessions about 20 months. Since World War II the recessions have been shorter and milder, lasting only about a year from peak to trough. There is, however, considerable variation around these averages and contractions have sometimes been longer than expansions.
- b. The severity of a recession in its early stages is often correlated to its ultimate severity. Historically, when industrial production and employment have dropped sharply during the first 6 months of a recession, the full decline during the recession has usually been large; when the initial declines were small the recession has usually been mild. The leading series provide advance clues to these developments.
- c. The rates of advance in aggregate economic activity during expansions have been more nearly uniform in different cycles than the rates of decline during different cyclical contractions. Thus a more accurate estimate can ordinarily be made of the rate of advance at the beginning of an expansion than can be made of the rate of decline at the beginning of a contraction.
- d. The rate of expansion has usually been more rapid in the early stages of an upswing – the first six or nine months – than in the later stages.

³ Cf. *Statistical Indicator Reports*, Statistical Indicator Associates, Leonard H. Lempert, Director, North Egremont, Massachusetts. A similar report for Canada is issued by W. A. Beckett Associates, Toronto, Canada. A commentary on business conditions is included with these reports.

- e. The rate of rise during the early stages of an expansion has ordinarily been more rapid after a severe contraction than after a mild one.
- f. Despite slower rates of expansion, recoveries have generally attained and exceeded previous peak levels much more quickly after mild contractions because the amount of ground to be recovered is smaller than after a severe contraction.
- g. The amount of expansion relative to the previous business cycle peak during the early stages of expansion is usually correlated with the level ultimately attained in that expansion. Thus the relative standing of the leading series during the first 6 months provides an early indication of the level of aggregative economic activity that will eventually be reached. The relative standing of the coincident series a few months later provides a similar indication. Thus, after about 6 to 9 months of expansion, the standing of the indicators compared to previous expansions may be helpful in forecasting the ultimate peak level of the current expansion.

In addition to this knowledge about business cycles, there are certain other kinds of information that are useful to bear in mind in trying to interpret current trends. For example, the knowledge of a prospective reversal in business conditions does not come at any one point in time. At first there may be scattered and tentative indications of recessive tendencies, perhaps in the behavior of the lagging series; later declines in leading series may occur and then become widespread and some of the coincident series may falter. Uncertainties also exist because the underlying pattern of cyclical movements is often disturbed by unusual economic and political events. Strikes and strike threats have been especially troublesome in recent years. Counter-cyclical actions taken by the government may also influence the course of events.

Again, although the leading series will frequently point to a decline in aggregate economic activity, they cannot pinpoint the precise dating of a turning point; to designate a peak or trough date, we must wait until some period after the fact, and such a determination must be based upon the coincident series.

The findings summarized above are useful for current business analysis, but there are a great many things that are not known about business cycles. A few are listed below:

- a. Little is known about the factors determining the duration of different expansions and recessions. For this reason the duration of these cyclical phases cannot be forecast reliably when they begin.
- b. While declines in the leading indicators have frequently been followed by a decline in aggregate economic activity, there is no historical basis for determining at about the time it occurs, whether the decline in the leading indicators is signaling a lull, a minor setback, or a decline of sufficient depth and duration to be designated a recession. Thus declines in the leading series can be interpreted at the most as signaling a decline in aggregate economic activity of unknown amplitude and duration.
- c. There is no historical basis for determining late in expansion whether the decline which follows will be mild or severe. Similarly, historical cyclical patterns do not indicate in the late stages of recession what the amplitude of the expansion is likely to be.

- d. Our present statistical techniques are usually inadequate for disentangling the more meaningful cyclical trends from seasonal and irregular factors in the current statistics. For this reason we frequently can only guess when a current change is "cyclically significant." Sometimes months must go by before trends underlying the criss-cross patterns in current figures become clear.
- e. Little is known about the quantitative effects of various economic policies at different stages of the cycle. The infinite variety of economic relations and the extraordinary range of international and military events which affect them complicate this problem. But effective application of the knowledge that we do have about current and prospective cyclical movements requires complementary information about the effects of economic policy.

An organized and extensive research effort to provide answers to these and many similar questions about business cycles continues to be a compelling need of our times.

7. APPRAISING CYCLICAL TRENDS AT DIFFERENT CYCLICAL STAGES

The use of the research findings may be illustrated by following a cycle from the beginning of an expansion, after a trough has been recognized. Though we can do better at some stages than at others, knowledge of past business cycles is helpful in making a forecast of trends during subsequent months. Armed with the general principles outlined above, it is usually possible, by studying the patterns of previous business cycles and with due allowance for governmental fiscal and monetary policies and other related economic, political, and international events, to estimate the trend six months to a year ahead.

After mild recessions the first year of expansions tends to follow the same general pattern: relatively mild recovery and early achievement of previous peak levels. Severe contractions are likely to be followed by more vigorous upward surges from the very low levels to which activity had fallen. After a year or so of expansion, a different judgment based upon the patterns of previous expansions can be made. In the absence of overriding external developments, and especially if preceding peak levels of activity have already been exceeded, the expected rate of advance is likely to be somewhat less during the second year than during the first. The fact that there is usually more variability in the rate of expansion in the second year than in the first should also be taken into account. The strength in the advance of the leading series during the first year, relative to that in the first year of earlier expansions, is another factor in judging the prospective pace of the second year of an expansion.

Of course, not all expansions have lasted two full years. Thus, of the 26 expansions recorded since 1854, ten have lasted less than two years. Two, one just prior to and the other just after World War I, lasted a year or less. The most recent expansion which lasted less than two years was that which extended from November 1927 to August 1929, a period of 21 months; the expansion from April 1958 to May 1960 scarcely exceeded two years. Thus, it is necessary to take into account the possibility that an expansion will last less than two years.

After two years forecasts of further expansion become even more difficult. For one thing, only 14 of the 26 expansions have lasted more than two years. Of these, four came during periods of war. Thus there is not much basis for making a judgment of the rate of expansion after two years on the basis of the historical record.

About all that can be said is that, if it continues at all, the advance is likely to be relatively moderate and to be characterized by many cross currents. The historical record of the duration of expansion similarly does not provide reliable clues to indicate when a reversal is apt to begin. However at this stage it is usually helpful to observe closely the behavior of the lagging series, especially those that represent rising business costs and potential business losses, for the strength of their advance may be a warning signal. Then we should turn to the leading series to see if they are as yet showing significant declines, and to the diffusion indexes for various groups of leading series to gauge the scope of the movement through the economy. These indicators are the ones most likely to provide warning signals of a coming downturn in the measures of aggregate economic activity. The diffusion indexes for the roughly coincident series should also be considered for clues to the emerging pattern.

Continuing along the cyclical course, it is likely that if downturns in the leaders and in the diffusion indexes are followed by downturns in measures of aggregate economic activity, a recession is underway. This finding can usually be established 4 to 6 months after the turning point occurs on the basis of the coincident series, and it can be confirmed a few months later by downturns in the lagging series. It then becomes important to determine promptly whether the recession is apt to be severe or mild, for the types of remedial measures taken will depend upon such a judgment. Knowledge of past recessions is helpful in this respect. As noted, severe recessions usually show relatively sharp drops in the early stages and mild recessions, relatively small drops. It is, therefore, helpful to compare current rates of decline with rates of declines in previous recessions at corresponding intervals after the turning points. The historical record shows that the ultimate decline during a recession has been correlated with the rate of decline which has occurred in the leading series about 4 or 5 months after the turning point. For the coincident series the same comparison is significant after 6 or 7 months. If, therefore, after 4 or 5 months of recession, the rate of decline in the leading series is severe compared with the rate of decline in previous recessions, there is reason to believe that the ultimate decline will be relatively large, in the absence of effective measures to combat recession. This inference is reinforced if the rates of decline in the coincident series are also comparatively severe 6 or 7 months after the turning point.

Finally, for signs of an end to a recession, warning signals are often provided by declines in lagging series and upturns in the leading series and the diffusion indexes. The signs are opposite to those that signal a downturn late in an expansion. Once a new trough is passed the cycle has been completed and a new cycle begins to take form.

While these characteristics of historical business cycle behavior are helpful in making forecasts, they do not provide automatic keys to the future. Each month the situation must be reconsidered in the light of the new data on business cycle indicators that become available and in the light of the new economic, political and international developments. Because of variations from the typical cyclical pattern and the uncertainties of economic and political life, frequent reappraisals of the prospective course of the business cycle must be made.

8. MERITS AND LIMITATIONS

The statistical record shows that leading series tend to lead, that coincident series tend to coincide and that lagging series tend to lag. It shows that the scope of expansions and contractions tends to narrow and the rate of change tends to slow down in the late stages of expansion and contraction. The inspection of the record since 1921 in *Signals of Recession and Recovery* shows that there were some early warning signals for every reversal. The theoretical reasons for this behavior are spelled out and more detailed statistical evidence is provided in the various essays in *Business Cycle Indicators*.

Despite this record the business cycle indicators approach to short-term business forecasting is by no means infallible and never should be used mechanically. Various limitations on their use were noted in the earlier sections, but the hazards of forecasting are so great that it seems desirable to bring them together in one place at the end of this primer.

The indicators occasionally give signals that lend themselves to misinterpretation. Sometimes such signals can readily be discounted, as in 1951 when the expansion of activity in the defense industries offset declines in others. Other times, as in 1956, the prospective downturn may have been delayed by the high levels of unfilled orders and the backlog of capital appropriations which provided a cushion for the economy. It is to be hoped that on occasion the signals will, after the fact, prove to have been false because they provided a sufficiently early warning for the government and business to take prompt counter cyclical measures which averted or mitigated a decline.

The variability of leads among series during a given cycle is another source of difficulty. To some extent this variability can be taken into account, since certain types of series, such as the accession and layoff rates, typically have longer leads than others, such as new orders, the average workweek and stock prices. Again, the variability of the leads of a given series from cycle to cycle is confusing. These variations may be related to the levels of backlogs of accumulated business, such as unfilled orders, unexpended capital appropriations and unstarted building contracts and permits. At the present level of our understanding of business cycle processes, however, the variability of leads must be recorded as one of the principal sources of difficulty.

There are often periods of hesitancy in the middle stages of expansions which are difficult to interpret when they are occurring. In fact, the most common pattern of expansion is a vigorous advance in the early stages, a "pause," and then another, but more modest, advance in the late stages. A major problem during an advanced stage of expansion appears to be that of distinguishing, currently, between declines in the leading indicators which are signaling only minor setbacks in economic activity and those which are signaling more significant changes. Similarly, some business contractions have reached "double bottoms" — periods of low activity separated by an advance and a subsequent decline. During such periods it is difficult to determine whether a new expansion has begun.

Business activity may also be affected by political, international and financial developments which cannot be encompassed in a statistical forecasting system. The Korean War during the 1949–53 expansion, the steel strikes of 1953, 1956 and 1959, the Suez crisis in 1956, the rapid swing from a government budget surplus position late in 1957 to a pronounced deficit early in 1959 and back to a surplus position in the spring of 1960, all had marked effects on the cyclical

pattern. The recent Cuban disturbance may have to be added to this list. Sudden changes in business confidence and consumer attitudes also must be reckoned with in appraising short-term prospects.

There are also problems of a statistical nature. The raw data on business activities collected from various sources must be adjusted to eliminate, as far as possible, the irregular and seasonal fluctuations so that the series will show, over time, primarily the cyclical movements. Many of the series in *Business Cycle Developments* report are seasonally adjusted by a method worked out at the Census Bureau (Census Method II) which is carried through with the aid of electronic computers. The seasonal factors, under this method, are computed from the historical data in the series being adjusted. However, no perfect method of seasonal adjustments has yet been found, and the adjustments of the current months often have a substantial margin of error. It is unfortunately true that the leading series are the most erratic – the average month-to-month changes in these series are usually larger than in the coincident series. As a result it is most difficult to distinguish random interruptions of the underlying trend from true cyclical changes in the leading series. While helpful in studies of historical cycles, no effective way has as yet been found to apply moving averages to the most current figures to smooth out irregular fluctuations because moving averages require data for future months, which, obviously, are not available. Such limitations of the data are probably most significant at the time when the greatest accuracy is needed – around business cycle turning points. At such critical stages of the cycle, the magnitude of the cyclical changes is frequently smaller than at other stages and confusing cross-currents are most likely to be dominant. Revisions of data are another source of difficulty. Frequently, in making judgments of the current economic situation, we must depend upon preliminary figures, which are sometimes substantially changed when final figures become available.

For purposes of forecasting future short-term trends, it cannot be stressed too much that the business cycle indicators must be used together with other data, such as the national income accounts, or financial statistics which are arranged in a different framework. Findings from contemporary studies of industry, consumer, and government trends and plans are obviously pertinent. Close attention must also be paid to contemporary industrial, financial, political, and international developments.

The difficulties of using the indicators are formidable. In interpreting current changes we are sometimes confronted with false signals, pauses in the underlying trends, variability in the performance of our most trusted series, shifts in attitudes arising from external events, and errors of measurement. Progress has slowly, but steadily, been made to reduce these difficulties. The publication of *Business Cycle Developments* has made it possible for many additional business analysts from different sectors of the economy to enter this field of study, and their combined contributions may be expected to expedite the solutions of some of these problems. However, while the inherent difficulties of forecasting changes in our vast and complicated economy may be reduced, they will never be completely eliminated, so that we shall always have to contend with a margin of error in our forecasts.

Each year research brings us new knowledge about the relations among business cycle processes. This knowledge is often helpful in interpreting current trends and prospects. The availability of the data in *Business Cycle Developments* each month and the widespread use of these data by businessmen, academic economists and government officials each month is bound to stimulate research studies and

to put the findings to hard tests. Consequently, the form and shape of this report may be expected to change and improve. But the basic approach of utilizing data such as appropriations, new orders, contracts, and new business formation, which relate to future rather than current production, as the basis for appraising prospective business conditions may be expected to remain unchanged.

In concluding, what can be said of the usefulness of business cycle indicators? It seems clear from the record cited above and spelled out in detail elsewhere that the business indicators are helpful in judging the tone of current business and short-term prospects. But because of the limitations described above, the indicators must be used together with other data; with full awareness of the background of political and international events; with the expectation that they will often be difficult to interpret; and with the knowledge that the signals they give will not always be correctly interpreted. To cite the appraisal made in *Signals of Recession and Recovery*, the indicators provide a sensitive and revealing picture of the ebb and flow of economic tides, which a skillful analyst of the economic, political and international scene can use to improve his chances of making a good forecast of short-run economic trends. If the analyst is aware of their limitations and alert to the world around him, the indicators do appear to provide useful guideposts for taking stock of the economy and its needs.

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RESUME

Le présent document expose ce qu'on connaît des indices des cycles économiques, des problèmes que soulève leur utilisation et des recherches requises en vue d'en accroître l'utilité. Pour plus de commodité, ce document suit l'agencement adopté par "*Business Cycle Developments*" (Evolution du cycle économique), revue mensuelle du Bureau du Recensement.

On a avancé plusieurs explications différentes des causes qui président aux fluctuations du cycle économique. Certains économistes soulignent le rôle des investissements en bien meubles et immeubles. D'autres mettent l'accent sur le rôle primordial de l'offre de capitaux et de crédit ainsi que du taux de l'intérêt. D'autres encore cherchent une solution dans les rapports qui existent entre les prix de vente et de revient d'une part et les bénéfices d'autre part. L'ensemble de ces facteurs influe sans aucun doute sur le cours de l'activité économique, encore qu'il n'existe aucun accord unanime quant à ceux qui jouent un rôle capital. La revue "*Business Cycle Developments*" donne des renseignements portant sur chacun de ces facteurs.

L'idée maîtresse qui est à la base de la méthode utilisant les indices du cycle économique est que les divers phénomènes économiques ont une tendance à évoluer de façon analogue pendant toute la durée du cycle, encore qu'avec un certain décalage dans le temps. On a donc groupé les indices du cycle économique en trois catégories principales.

Les indices "anticipés" correspondent à une activité qui implique une production et un emploi futurs. Ils constituent, pour ainsi dire, des signes avant coureurs. Les indices "concomitants" ont trait essentiellement à l'activité économique dans son ensemble et comprennent des données telles que le produit national brut, la production industrielle et l'emploi dans les secteurs non agricoles. Les indices "postérieurs" correspondent à des secteurs d'activité qui suivent l'activité économique dans son ensemble tels que, par exemple, les prix de revient.

D'autres informations concernant le cycle économique sont également utiles pour l'interprétation des changements économiques actuels et des perspectives à court-terme. Par exemple, pendant les dernières phases, l'écart des expansions et des resserrements s'amenuise et s'accompagne en général d'une diminution du rythme des variations. Cette évolution se traduit dans les indices de diffusion et le rythme des variations. De même, nous savons que la gravité d'une récession à ses débuts est souvent liée à la gravité qu'elle revêtira vers la fin et que le rythme d'expansion a été généralement plus rapide au début d'une montée brusque que dans les phases ultérieures.

Il n'en reste pas moins que bon nombre de renseignements concernant les cycles économiques font défaut. Par exemple, on ne possède que peu d'éléments d'information sur les facteurs qui régissent la durée des expansions et des resserrements. Il n'existe aucun moyen de déterminer si un abaissement des indices anticipés est le signal d'une période de stagnation, d'un recul ou d'une récession.

Il n'existe pas non plus de base historique qui permette de prédire, au cours d'une période d'expansion si l'abaissement qui suivra sera modéré ou grave. Des recherches organisées et poussées pour trouver la réponse à ces questions et à de nombreuses autres, analogues, concernant les cycles économiques sont une des nécessités majeures de notre époque.

L'utilisation des indices soulève d'autres difficultés. Nous nous trouvons parfois en présence de pauses dans les tendances sous-jacentes, de variations dans le comportement des celles de nos séries auxquelles nous prêtons le plus de foi, de changements d'attitudes imputables à des événements extérieurs, et d'erreurs de mesures. C'est pourquoi il est indispensable d'utiliser les indices, conjointement avec d'autres données en ayant pleinement conscience de l'arrière plan des événements politiques et internationaux et en sachant qu'ils risquent d'être souvent difficiles à interpréter.

Dans l'ensemble toutefois, il apparaît que les indices donnent bien un tableau fidèle et révélateur des variations de la vie économique et qu'ils constituent pour un analyste averti de la scène économique, politique et internationale un moyen d'augmenter les chances qu'il a de prévoir correctement les tendances économiques à court terme.

DISCUSSION

C. T. SAUNDERS: In principle, the “leading indicator” approach to forecasting is inferior to econometric models: the indicators at best provide qualitative predictions of turning points and of changes in rates of change; in principle, a model provides a quantitative prediction. But this comparison is somewhat academic since no model has yet been devised for the U.S. which in fact predicts even turning points with as much success as the leading indicators.

However, if some faintly malicious questions may be asked, I would like Mr. Shiskin’s comments on two points:

(a) to the rather superficial observer, it seems that the upturn of early 1961 was not predicted by the leading indicators since they seem to have turned up almost simultaneously with the “coincident” indicators. Even security prices, which on previous occasions seem the most reliable single leading indicator, then failed to lead.

(b) in early 1962, it seemed (again, perhaps only to the superficial observer) that the leading indicators were pointing with some clarity to a recession before the end of the year. Would a more sophisticated reading of the indicators have led to a different conclusion, or was the threatened recession averted (e.g. by the increase – perhaps not consciously anti-cyclical – in Federal expenditures)?

The paper raises in one’s mind the question of whether the method can be applied in other advanced countries. I know it has been applied with some success in Canada. Dr. Miconi has applied it in Italy (to predict changes in rates of change – since there has been no significant *decline* in business activity). It was applied to U.K. series by a Greek research student at the London School of Economics (Dr. C. Drakatos) and some possibly significant leading indicators were found (though not the same ones as in U.S.). Indeed one series apparently led so consistently and with so long a lead, that we concluded it was really a lagged indicator.

J. SHISKIN: I will start off with a hackneyed remark: “I am very glad you asked me those questions”. First of all, I try to make it clear in my paper that there are a great many things we don’t know about the use of indicators and they are not, of course, offered as a mechanical way to make a forecast. All of us who have worked with the indicators at one time or another have found that we have made mistakes, I speak not only for myself but as well for some of the people I work most closely with in this field, when I say we learn something new every time there is a turning point.

Now with respect to the particular questions, I would say we did well in 1961. I followed the statistics carefully during that period. While it is true some of the leading indicators did not turn up until February, the diffusion indexes were very strong before February. They rose for several months in a row vigorously, and then some of the most trusted leading indicators rose a month or two before, for example, stock prices. Geoffrey Moore, one of the pioneers in this field, has been fond of saying that he feels the most you can hope for from the indicators is to be able to determine the turning point at about the time it occurs. I think we did a little better in 1961. In December-January most of us were convinced that a turn was imminent. None of us had the audacity to say that the turn would come in February or March and, in fact, we may not even know at this time exactly when it came. Five years from now some of the statisticians in this room may revise the figures and we may find the turning point has shifted a bit. But we were all quite confident at the beginning of 1961 that the end was in sight. So, since you ask my opinion, I’ll offer it that one of the successful uses of the indicators was in connection with the 1961 turning point.

The retardation in 1962 is a much more complex subject. There is not the slightest doubt that the decline in the leading indicators in the Spring of 1962 was of a magnitude and scope that commonly occurred in advance of a recession. However, it is very important to note that the decline in the leading indicators in 1962 was arrested. It was arrested very promptly after only a few months of decline. The leading series continued at a fairly even level for 3 or 4 months during the summer, and then began to go up. Now, those who like the theory which explains business cycles by new investments were arguing that no recession was in sight because orders and contracts had held up quite well. But they were a minority of the series and revised data show that they too declined. Why was the decline in the leading indicators arrested in the Spring of 1962, and reversed? Why was it that this did not happen at any other time? I don't know the answer to that question but a great many people are taking credit for having caused that reversal. Some people give some credit to the business indicators approach. They say the signal came promptly, action was taken, and there was a reversal. Others say that it was very skilful use of monetary and fiscal policy. Walter Heller has made a statement along that line in a recent speech he made and I, personally, think there is a lot to it.

Another factor that was of very critical importance, I think, in reversing the movement in 1962, was the Cuban episode. The Cuban episode came at the end of October, and October was a very critical month. This led to an expansion of military activity, an increase in consumption of gasoline, a great increase in travel, and, I think, a change in consumers' attitudes. I do not think that the increase in government expenditures in the 4th quarter was accidental. It is true that the Budget for the year was substantially higher than the previous year; but after the decline in the stock market, the Administration made a vigorous effort to speed up its housekeeping functions – to spend more early. I think that it took 2 or 3 months to get that under way and the climax came in October, November and December. So that program lifted the economy a bit at a crucial point.

Finally, I think the prospects of another steel strike in the background also was an expansionary force. So I think what happened in 1962 – my own interpretation – is that the renewed expansion came as a result of the culmination of good Administration policy, the accident of the Cuban blockade coming at that time, and the steel strike in the background. Others will have different explanations, but this is mine.

On the final point I really have only a bit to say. In any economy that is organized in the same way that ours is, where orders have to be placed for certain kinds of equipment, where contracts have to be let, where hours of work can readily be adjusted, the leading indicators will be useful in foreshadowing future developments, not necessarily recessions or expansions, but the pace of future activities.