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Introduction

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I

The National Bureau of Economic Research has been engaged in studying business cycles virtually since its beginning in 1920. During that period about seventy books and shorter papers on business cycles have been issued, and many other Bureau publications have been partly concerned with the subject.[1] This work has been directed toward the basic problem of how business cycles come about and what circumstances or policies make for variations among them. From time to time, in view of the great current interest in gauging short-term economic prospects, we have also developed certain by-products of the basic research that promised to be immediately helpful.

The first such by-product, *Statistical Indicators of Cyclical Revivals,* by Wesley C. Mitchell and Arthur F. Burns, was published in 1938. In 1950 a similar study, which provided a list of indicators of cyclical recessions as well as revivals, was completed. The present volume carries this line of research forward. Many of the earlier findings are tested against subsequent experience, their rationale is explained, and a new list of indicators that draws on recent work is presented (Chapter 3). The new list takes into account both the postwar experience with the previously selected indicators and the availability of new statistical compilations that have proved their worth. In addition, several recently developed methods of using measures of cyclical behavior for forecasting are described (especially in Chapters 3, 5, and 18).

Besides this new work, we have reprinted in this book a number of the previously published reports, without revision (except in two instances noted below). These reports constitute the historical record of a series of experiments, and it is well not only to bring them together (and make available those that are out of print), but also to preserve their original form, since revision would only make it more difficult for others to evaluate the record. Finally, the appendixes to this volume and the whole of volume II contain many of the historical data on which the studies were based and which may provide useful materials for those concerned with interpreting current trends.

II

In a book of this kind, which contains essays written by different individuals over a span of twenty years, there is bound to be considerable

[1] For a list of these reports, see the end of this volume.

repetition. For this reason, and also because the book is designed primarily for reference rather than to be read as a continuous report, the reader may profit from a chapter-by-chapter guide to the contents. The following paragraphs attempt to do this, while the succeeding section undertakes a more integrated account.

The ten essays that comprise Part One deal with the general problem of selecting, testing, and interpreting business cycle indicators. The first three summarize much of what comes later in the book. The excerpt from Solomon Fabricant's "Basic Research and the Analysis of Current Business Conditions" shows how the program of basic research carried on at the National Bureau has contributed to the development of economic indicators and to knowledge about their behavior, and underlines the importance of continuing such a program if further progress is to be made.

Arthur Burns' "New Facts on Business Cycles," written in 1950, takes up the more significant findings and weaves them into a constructive account of the cyclical process. Here the reader will find, as the author says, "a few facts developed by our investigation that may prove of some help to economists and men of affairs facing the hard task of appraising an uncertain future."

In Chapter 3, "Leading and Confirming Indicators of General Business Changes," I attempt to bring some of our findings in this field up to date. This report was originally written in 1955, but I have taken this occasion to revise it to include more recent data and results. It describes the post-World War II behavior of the twenty-one indicators selected (in 1950) on the basis of pre-World War I records, and presents a new list of twenty-six indicators. The new list includes many of the indicators on the old list, but makes some additions and substitutions on the basis of recent research and observation of cyclical behavior during the postwar period. The report also reviews our studies of diffusion indexes and of methods of measuring currently the magnitude of recession and recovery movements.

The fourth essay is an appraisal of the 1950 list of indicators by Frank E. Morris, Research Director of the Investment Bankers Association of America. Morris has issued a monthly report interpreting the current movements of these indicators and related economic data since 1956. His contribution not only reviews this experience but also describes a new statistical technique that he has found useful.

Next is my study, "Measuring Recessions," which utilizes a group of indicators to measure the severity of a recession while it is in progress. This study was undertaken while the 1957–58 business contraction in the United States was going on. An addendum shows how the experiment ultimately turned out.

The sixth essay is the famous report by Wesley C. Mitchell and Arthur F. Burns, "Statistical Indicators of Cyclical Revivals," published in 1938. Utilizing the cyclical measures for the 487 time series then in the National Bureau's files, they define criteria for the excellence of an indicator of revival, find some seventy-one that meet these standards in part, and give a high rating to twenty-one of these. They go on to discuss some of the difficulties besetting the user of indicators, and warn of the limitations attaching to the interpretation of these fallible guides. This statement is full of practical hints still helpful today to anyone trying to keep abreast of business changes.

Shortly after World War II, I undertook to revise and bring up to date the Mitchell-Burns study, and the report published in 1950—"Statistical Indicators of Cyclical Revivals and Recessions"—is Chapter 7. It begins with a test of the twenty-one series selected by Mitchell and Burns, using data for 1937 and 1938, a period of recession and revival they did not cover in making their selection. It goes on to apply criteria analogous to those used in the earlier study to the 801 series that had by then been assembled by the National Bureau for its cyclical studies, and ends up with the twenty-one deemed most useful in identifying either revivals or recessions. The list of twenty-one series includes some of the series on the Mitchell-Burns list, or close equivalents; it includes others that were not available when they wrote and omits some that had become obsolete. As noted above, this list has itself become obsolete. The report also describes some experiments with a method of combining the indicators into a diffusion index that tells in what direction and how concertedly they are moving.

Chapters 8 and 9 report further work on diffusion indexes. "The Diffusion of Business Cycles" describes various ways of measuring the scope or degree of generality of changes in business activity and what such measurements reveal about business cycles. Here is marshaled much of the evidence for what Arthur Burns termed "the unseen cycle" that appears in the movements of the components of economic aggregates and foreshadows the movements in the aggregate itself. "Diffusion Indexes, Rates of Change, and Forecasting" considers the conceptual and empirical differences between diffusion indexes and rates of change in economic aggregates and takes up the problem of measuring diffusion on a current basis.

The final essay in Part One, by W. A. Beckett, describes an interesting study by the Canadian Department of Trade and Commerce of indicators and diffusion indexes for Canada paralleling those developed in our studies for the United States. From one point of view, this constitutes a test of the validity and significance of the procedure followed in selecting the indicators and the stability of the behavior characteristics of the

economic processes they represent. It is, incidentally, the kind of test long envisaged by Wesley Mitchell, and which he carried out in part by analyzing British, French, and German statistics.[2]

Part Two brings together several essays that try to explain the behavior of particular types or closely related groups of indicators. Many of the National Bureau's business cycle studies have been of this character—devoted to a particular sector of the economy. In selecting essays from this literature, and in arranging for new papers, we have imposed the limitation that they treat primarily one or another of the types of leading indicators (or diffusion indexes) discussed in Part One. This is not to gainsay the importance of other factors in judging the business outlook. For a wider view, the reader is urged to consult other National Bureau publications on business cycles listed at the end of this book.

Occupying a central position in many theories of business cycles are the profits of business enterprises, for the hope of gain or fear of loss are powerful motivating forces in our economy. Thor Hultgren added greatly to our understanding of the role of profits during business cycles in his "Cyclical Diversities in the Fortunes of Industrial Corporations," the first essay in Part Two (Chapter 11). From his work we learn, for example, that the number of companies with rising profits was largest, not in 1929, but in 1928, and not in 1937, but at the end of 1935. In other words, some six to twelve months before these peaks in business activity or in aggregate profits, the number of companies with rising profits began to dwindle. Indeed, as I point out in "The Diffusion of Business Cycles," the turns in the diffusion of profits have usually preceded the turns in other diffusion indexes, and have been closely associated with those in new orders for investment goods. Diffusion of profits, therefore, is a most significant "leading indicator."

Statistics of business failures have for many years been used as an index to the profit situation. Victor Zarnowitz and Lionel J. Lerner, in Chapter 12, "Cyclical Changes in Business Failures and Corporate Profits," throw light on one of their most intriguing manifestations, the fact that for nearly a hundred years the aggregate liabilities of failures have tended to lead business cycle turns whereas the total number of failures has not.

Although the number of firms going out of business (through failure) has not systematically led the cycle in aggregate activity, the number of

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[2] Cf. Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, New York, NBER, 1946, pp. 18ff. Similar studies of indicators and diffusion indexes for Japan have recently appeared. See *Compilation and Analysis of Indexes of Business Cycles in Japan, 1951–57*, Statistics Department, The Bank of Japan, Tokyo; *Postwar Diffusion Indexes for Japan*, Division of Statistics, Bureau of Economic Research, Economic Planning Agency, Tokyo, April 1959; and *Business Forecasting in Japan*, Business Forecasting Study Team, Japan Productivity Center and International Cooperation Administration, April 1959.

firms starting up in business (new incorporations) has exhibited this tendency. In Chapter 13, "Cyclical Aspects of Incorporations and the Formation of New Enterprises," Zarnowitz reviews the facts about the timing of cyclical changes in the number of new incorporations and their relationship to the more recently available figures on the formation of unincorporated as well as incorporated enterprises. He points out that when the figures on the formation of new firms are set against those on discontinued firms, the resultant—which is the net change in the business population—is an indicator that has turned ahead of each of the six postwar turns in the business cycle.

From the starting of new firms, we turn to another aspect of invest-ment: the ordering of goods. "The Timing of Manufacturers' Orders During Business Cycles" is a summary drawn from Zarnowitz' compre-hensive study of new orders. How regular and universal is the lead of new orders relative to production, shipments, or general business activity? How does the lead vary when goods are made to stock rather than to order, when capacity is fully instead of partially utilized, or when unfilled orders are increasing rather than declining? In the answers to these questions, we can see emerging some clues to a general problem that plagues the user of indicators—why a decline in one or another "leading indicator" sometimes precedes the general decline by many months and sometimes by only a few months or not at all.

The impact of an increase in new orders will make itself felt upon the labor market, and one of the first effects is likely to be an increase in the length of the workweek. Gerhard Bry's analysis of "The Timing of Cyclical Changes in the Average Workweek" explains why this is so and how it turns out that in virtually all industries changes in the work-week take place before changes in the number employed.

In the final essay in Part Two, "Business Cycles and the Labor Market," I try to show how cyclical changes in the workweek, in employment, in the number of industries with rising employment, in hiring and layoff rates, in hourly earnings, and in labor costs per unit of output form an interrelated system. Within this system we find a suggestion that one of the most laggard of indicators—labor costs per unit of output—may nevertheless react upon some of the most systematic of leaders—the hiring rate and the average workweek—as well as vice versa. Clearly the labor market is not a closed system. It is acted upon and reacts upon many other factors in economic life, which is merely to say that an understanding of business cycles requires a comprehensive view, and that the materials selected for this book simply contribute pieces of it.

Part Three is designed to assist those who are impatient to turn the indicators to practical use or to test some ideas of their own. It starts

with Julius Shiskin's essay, "Electronic Computers and Business Indicators" (Chapter 17), which demonstrates how the usefulness of indicators for current business analysis can be increased by correcting for working days, adjusting for seasonal variations, and smoothing irregular movements, and how such adjustments can be made quickly and at relatively low cost by an electronic computer program. It points out that this program can be used by business concerns and others to analyze their own records and relate them to similarly adjusted industry, regional, or national data. Some useful measures of seasonal, cyclical, and irregular behavior are given for a number of business indicators.

The next report, Chapter 18, "Statistics for Short-Term Economic Forecasting," describes a massive application of an electronic computer program for deriving diffusion indexes and measures of the rates of change in economic activities. Shiskin recounts how this aided in developing a system of current monthly reports on a wide variety of economic data for the Council of Economic Advisers during the 1957–58 recession and recovery. The report also demonstrates a new method of deriving seasonal adjustments of weekly data by electronic computer, which promises to remove one of the major obstacles to the effective use of the many important industrial, commercial, and banking statistics available on a weekly basis.

Chapter 19, "An Amplitude Adjustment for the Leading Indicators," makes use of one of the measures provided by the electronic computer program and describes a method of adjusting each member of a set of leading indicators so they will have the same average cyclical amplitude. In the illustration, they are equated to the amplitude of the index of industrial production, but the standard might equally well be employment or the sales of an individual business firm. The method can be used in constructing an index where it is desired that the cyclical swings in each component have, on the average, an equal effect upon the index, so that components with naturally large swings will not swamp those with a more limited range.

The final chapter, "A Technique for Summarizing the Current Behavior of Groups of Indicators," describes the construction of diffusion indexes and the "average duration of run" as ways to keep up to date on the movements of a collection of indicators.

A word about the appendixes is in order, since they provide both documentation for many of the findings reported in this book and materials for further study and practical application. Appendix A gives the National Bureau's hundred-year chronology of business cycle turning points in the United States, together with some summary measures of the duration of these cyclical swings. This chronology provides the basis for Appendix B, which contains a complete listing of the monthly leads

and lags of selected indicators at successive business cycle peaks and troughs. Appendix C consists of tables showing the percentage rates at which various economic indicators have moved up or down during the first three, six, nine, etc., months of business cycle expansions and contractions. Thus they provide a scale on which to measure the severity of current changes. Finally, Volume II presents monthly and quarterly historical data, seasonal adjustment factors, and brief descriptive source notes on selected indicators and diffusion indexes. These basic data are carried through 1958.

III

Because of the limited aim and content of this book, as just described, it contains only a portion of what has been learned at the National Bureau about business fluctuations. Moreover, it does no more than explore one or two approaches to the problem of business forecasting. Even these explorations are not complete. Nor can they be, since new evidence accumulates as every business cycle unfolds and new historical information is developed about previous cycles. Information provided by the three postwar business cycles (1946–49, 1949–54, and 1954–58) has been drawn upon in many of the chapters, primarily in an effort to test or evaluate or interpret more fully the earlier work. These tests have led to a better understanding of both the value and the limitations of business indicators. They have also led to a better understanding of how they can supplement, and be supplemented by, other data and methods in appraising economic prospects.

These matters are treated at length in the essays below, but it may be helpful here to summarize what seem to be the chief results, from the viewpoint of those concerned with the analysis of current business conditions.

MEASURES OF BUSINESS CYCLE DURATIONS

A chronology of business cycle peaks and troughs, by months since 1854, shows that the durations of periods of rising economic activity and of falling activity vary widely. In 1937, Wesley C. Mitchell and Arthur F. Burns wrote that "they differ so much and so irregularly that they give little help in judging when the next cyclical turn may occur" (see Chapter 6). To illustrate their point, consider the five business cycle contractions and four expansions experienced in the United States since 1937. If the median length of contractions before 1937—eighteen months —had been used to forecast the lengths of contractions since, it would have overshot the mark in each instance: by five months in two cases, seven months in one, nine in another, and ten in another. On the other hand, the median expansion before 1937—twenty-two months—was exceeded

in each of the four expansions since, and by substantial intervals (see Appendix A).

This does not mean, however, that knowledge of these durations is wholly without value. Notions that are, in the light of the record, extremely unlikely to come true can be avoided. For example, there is little point in entertaining cycle theories that imply that contractions are as long as expansions, or that a contraction as long as that from 1929 to 1933 is typical, or that there is a strong tendency toward a uniform duration. Furthermore, the record can be analyzed with an eye to factors that may help explain variations in cycle duration. In 1946 Burns and Mitchell found some evidence, for example, that a rising secular trend of prices was associated with shorter business cycle contractions.[3] Abramovitz recently reported that shifts in the relative duration of business cycle expansions and contractions appear to have been associated with long swings in the level of building activity.[4] The historical correlation between the severity of a business contraction and the period required for economic activity to regain its preceding peak level can be used to indicate, within a broad range, when this recovery point will be reached (see Chapter 5). Finally, there is evidence that shifts in the structure of our economy have tended to shorten business contractions and to prolong expansions in the postwar period.[5]

Although none of these ideas will pinpoint the date of the next downturn, or upturn, they should reduce the element of guesswork to some degree, especially when used in conjunction with other information of the sort mentioned below.

LEADS AND LAGS

A degree of stability or persistence characterizes the lead-lag relations among certain types of economic processes. These types are specified in the studies reported below, and the leads and lags measured. For example, numerous series representing various kinds of investment commitments, such as new orders for equipment or contracts for office and factory construction, have shown a persistent tendency to reach cyclical peaks and troughs a few months before those in aggregate output or employment. Inventories, on the other hand, especially of finished, staple goods, have persistently lagged. Many continuing features of the economic environment, not just one or a few, account for these typical leads and lags. Hence it is possible to choose groups of indicators whose timing will remain tolerably consistent with their past behavior.

[3] *Measuring Business Cycles*, pp. 437–440.
[4] *Thirty-eighth Annual Report of the National Bureau of Economic Research*, May 1958, pp. 50–52.
[5] Cf. Arthur F. Burns, "Progress Towards Economic Stability," *American Economic Review*, March 1960.

This, at any rate, has been the history of the National Bureau's studies of indicators. For example, the list of twenty-one indicators published in 1950 was selected on the basis of studies of their cyclical behavior prior to 1938. No one of these indicators had a "perfect" record before 1938. As a group, they reached cyclical turning points in a manner consistent with certain broad criteria in about two-thirds of the cases. Between 1948 and 1958 they reached turns consistent with the same criteria in two-thirds of the cases. On the whole, therefore, the indicators did as well in the postwar period as could have been expected in the light of their prewar record (for further details, see Chapter 3).

The lead and lag patterns of economic time series form a continuous sequence. Downturns in the leading processes are followed by downturns in the lagging processes, which in turn are followed by upturns in the leading processes, then upturns in the lagging processes, downturns in the leading processes, and so on. The intervals involved, however, vary considerably from one cycle to the next. To a degree, this difficulty can be reduced by using many indicators instead of just a few, and by taking into account factors known to be associated with such variations. For example, the leads of new orders relative to output tend to be longer when unfilled orders are high and rising than when unfilled orders are low or falling (see Chapter 14). Again, since there are persistent differences in the timing of different types of inventory, changes in the timing of aggregate inventories can be analyzed by examining their changing composition.[6]

Most of the leads and lags referred to in this book have been measured by comparing cyclical turning points in a given economic indicator with those in general business activity, as represented by the business cycle chronology mentioned above. This procedure should not divert the reader from considering the economic relations between or among the indicators. Indeed, its basic purpose is to facilitate analysis of inter-relationships. The use of standard business cycle dates enables one to make some approximate statements about the timing of each indicator relative to any other, and *these* are the timing relationships that are significant.

For this reason, if the forecaster is to get the most benefit from a record of the leads and lags of a set of indicators, he should consider the various ways in which, on economic grounds, they might be expected to act upon one another in a manner consistent with the timing information. He may suppose, for example, that new orders have a bearing on future production, that the workweek is an instrument for getting prompter

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[6] See Moses Abramovitz, *Inventories and Business Cycles*, New York, NBER, 1950, and Thomas M. Stanback's report in the *Thirty-ninth Annual Report of the National Bureau of Economic Research*, May 1959, pp. 43–44.

changes in labor input than altering the work force, that high interest rates and tight credit conditions deter new housing commitments, and so on. The observed leads and lags help to make sense of these suppositions, and to test and measure their validity or strength. Moreover, if in any particular instance the usual sequence does not obtain, the information may be no less valuable. During the 1954 recession the fact that retail sales began to rise vigorously well before employment or labor income picked up, reversing the usual sequence, could be interpreted as a strongly favorable factor in the outlook.

THE DIFFUSION OF BUSINESS CYCLES

The spread or diffusion of cyclical movements over a wide variety of economic processes takes time, and so does the diffusion of change in a single process over many business firms or industries. As a result, a business cycle expansion usually grows narrower in scope for many months before it comes to an end. Similarly, a contraction becomes less widespread before it ends. These intervals, as recorded by "diffusion indexes," have been measured, and like the leads and lags just referred to, vary considerably from one cycle to another. Moreover, irregular fluctuations interrupt and confound the longer swings. Nevertheless measures of diffusion help to interpret and support other types of evidence on the cyclical position of the economy as a whole.

MEASURES OF CYCLICAL AMPLITUDE

These measures can be used to analyze the relations not only among contemporary swings in different economic processes, but also among successive swings in the same process. With respect to the first, a vital point is that the relations among *cyclical* movements of different processes often differ from those among other types of movement that economic time series undergo. Cyclical swings in personal income and in retail sales are related, but the relationship is very different from that between seasonal movements in income and retail trade. Over the years the number of persons unemployed has trended upward and so has the number employed, but the cyclical movements of employment and unemployment are almost invariably inverse to one another. To take another example, the secular trends in employment and in the average length of the workweek in manufacturing have been opposite in direction: employment rose while the workweek dropped. But their cyclical movements on the whole have been positively related, especially if one takes account of the lead in the workweek. This lead, which has averaged about four months, means that at certain stages of the cycle—i.e. the turning zones—the cyclical movements of total employment and the average workweek have been inversely associated, just like the trends.

Even the relations between the irregular or "random" movements of time series may differ from the cyclical relations. For example, the 1959 steel strike depressed the volume of new orders for durable goods at just about the same time that it reduced the volume of output, whereas in cyclical movements new orders lead output by four or five months, on the average. Measures that purport to relate the cyclical amplitudes of different processes to one another, but fail to take into account such factors as these, can be seriously misleading.

Knowledge of the relations among cyclical amplitudes of different economic variables has various uses in forecasting. For one thing, it provides a check on the consistency of forecasts. For instance, the typically larger swing in the output of durable than nondurable goods, in orders for goods than in output, in commodity output than in services, in private than in public employment, in wages than in salaries, in "blue collar" employment than in "white collar," in raw material than in finished goods prices, in short-term than in long-term interest rates, in low-grade than in high-grade bond prices, in profits than in dividends or sales—all these and other historically established tendencies can be used to check the internal consistency of forecasts that deal with such variables. Another use of such information is to analyze the influence of trends in the structure or composition of various aggregates on the size of their cyclical movements. Thus the secular rise in the relative import-ance of service industries can be counted as one of the factors tending to lessen the severity of contractions in total output and employment in recent years, and the effect of a continued projection of this trend can be estimated. Again, the forecaster may find it useful to know that changes in business inventories have typically constituted a larger fraction of the increase in output in the initial stages of an upswing than in the later stages, and similarly in the downswings.

Turning next to measures of the amplitude of successive swings in the same process, two facts of importance in forecasting expansions stand out. First, most indexes of aggregate output, employment, trade, income, and profits show greater consistency in rates of growth during successive cyclical expansions than in rates of decline during successive cyclical contractions. The forecaster, standing near the bottom of a depression and looking up, should be able to make a closer estimate of the level of output a year or two hence, than when standing near the peak of prosperity and looking down. He can do this simply on the basis of past average rates of change during successive cyclical expansions or con-tractions.

Second, rates of expansion in output, employment, trade, income, and profits are usually higher when the expansion follows a severe contraction than when it follows a mild contraction. Hence forecasts of the rate of

expansion can take advantage of this correlation. This is especially true of initial rates of expansion, i.e. over the first six or twelve months.

To judge from the body of evidence that has been built up in recent years relating various kinds of economic forecasts to the actual changes that subsequently took place, an awareness of these two facts would help to improve many forecasts. One of the typical findings—and this seems to apply whether the forecasts are made by businessmen or by economists—is that forecasts made shortly after a business cycle expansion has gotten under way tend to underestimate the rate of increase in economic activity during the first year or so. This does not mean that every individual forecast has been too low, but merely that a substantial majority has been too low. Many of the forecasts, when compared not only with the subsequent actual recovery but also with previous re-coveries, fall well below any of them. Any individual recovery, of course, may fall outside the range of previous experience, but there is no need to continue to make forecasts that are demonstrably on the low side of this range.

This is not to imply that forecasts based on average rates of change during previous business cycle expansions will be highly accurate. The historical variation in such rates has been substantial, even when allow-ance is made for some of the factors associated with this variance, such as the severity of the preceding contraction or the outbreak of war. But it does seem that many forecasts could be improved, especially those made in the early stages of a recovery, if the forecaster adjusted his forecast in the light of the historical record of rates of recovery.

The greater variability in amplitude of the contractions in business activity makes averages of past performance less useful than in the case of expansions. Moreover, there seems to be little connection, in most indica-tors of aggregate activity, between rates of contraction and preceding rates of expansion. The connection, as just noted, runs the other way around. Nevertheless, after a contraction has been under way a few months, mea-sures of the rate of decline to date appear to have some forecasting value, especially when such measures are constructed from "leading" indicators. For example, the declines in most leading indicators during the first three or four months following the business cycle peak have usually been rela-tively sharp when the business cycle contraction has turned out to be severe, and relatively moderate when the contraction has turned out to be mild.

ELECTRONIC COMPUTER PROGRAMS

Despite the fact that the studies reported in this book concentrate upon the simpler systematic relationships among economic processes, such as are reflected in leads and lags, percentage changes, and simple

correlation statistics, the reader may well find that providing himself with a kit of these tools, adapting them to his own needs, and keeping them up to date is a burdensome operation. Fortunately, the advent of the electronic computer is changing this situation rapidly. Moreover, the availability of computer programs is beginning to change the character of published data.

One of the most time-consuming prerequisites for an analysis of the cyclical behavior of an economic time series is the estimation and elimination of its seasonal variations. Since knowledge of the value of this kind of adjustment dates back many years, it is perhaps surprising that the fact is not more widely recognized. Indeed, the use of same-month-year-ago comparisons is so popular in the press and in company reports, and is so misleading at cyclical turning points, that it may well be one of the factors responsible for the conservative bias of forecasts of cyclical recoveries mentioned earlier. The electronic computer will hasten the end of this situation. During the past two or three years virtually all important national economic series have been seasonally adjusted by the electronic computer program described in Chapter 17, and many of these data are provided in Volume II. Before long, current seasonally adjusted figures for unemployment, retail sales, or corporate profits will become as commonplace as they now are for the Federal Reserve production index or gross national product.

Elimination of seasonal is merely the first step toward cyclical analysis. Further steps, such as smoothing, trend calculation, and measurement of cyclical amplitudes, rates of change, recovery and recession patterns, and cyclical diffusion, have been programmed for electronic computers, and these programs, like the seasonal program, are available for general use (see Chapters 5, 17, and 18). Some of these measures may, in time, prove of sufficient interest to warrant regular publication together with raw and seasonally adjusted data.

The electronic computer, in short, makes the construction of the analytical measures described in this book far more feasible than ever before. Many of them can well be applied not only to "business cycle indicators," but also to data on other economic activities that have a less regular but scarcely less important relation to the business cycles of experience. The student of current economic affairs, therefore, will in the future have at his command measures of cyclical behavior, both "ready-made" and "made to order," applied to a wide range of economic data. These should enable him to use historical knowledge and current information ever more effectively, and thereby improve his judgments on what the economic developments he observes portend.