Volume Title: Cyclical Analysis of Time Series: Selected Procedures and Computer Programs

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Volume Publisher: NBER

Volume ISBN: 0-87014-223-2

Volume URL: http://www.nber.org/books/bry_71-1

Publication Date: 1971

Chapter Title: Foreword to "Cyclical Analysis of Time Series: Selected Procedures and Computer Programs"

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Chapter URL: http://www.nber.org/chapters/c2146

Chapter pages in book: (p. -1 - 0)

FOREWORD

THIS STUDY IS CONCERNED with some programmed approaches to business cycle research as they are used at the National Bureau of Economic Research. It describes a programmed selection of cyclical turning points in time series, currently under development, as well as the Bureau's standard business cycle analysis and recession-recovery analysis. The analytical approaches are sketched, the statistical measures are described, and the problems typically encountered in the interpretation of these measures are discussed. Illustrative output tables are provided in the appendixes to each chapter. Descriptions of the various computer programs, their scope, available options, and limitations are available on request in the form of mimeographed supplements, which also contain technical instructions and caveats essential for the practical implementation of the programs. The programmed approaches eliminate some of the barriers that, in the past, have restricted the use of the techniques described. It is hoped that this book will promote a wider application of the analyses.

In the description of the general approaches as well as in the illustrative interpretation of the computed analytical measures, we address a somewhat less specialized audience than that to which Wesley C. Mitchell, Arthur F. Burns, and Geoffrey H. Moore directed their original expositions of business cycle measurements. This is done in the expectation that acquaintance with the computerized approach will induce analysts to use the techniques—among them, analysts who might shy away from the investment in the detailed procedural knowledge and experience necessary for conventional processing. Since many of the technical steps and even some procedural decisions are programmed, it is possible to dispense with most of the mechanics and to concentrate on the rationale of the analysis and the problems of interpreting results. A current restatement of the approaches also permits the incorporation of some thoughts developed after the publication of the early studies, and it promotes the dissemination of some of the practical wisdom that typically accrues in the process of making mistakes, be it in operation or in interpretation. In that sense, the present book is expected to contribute not only to operational facility but also to a better understanding of the techniques and their results.

This monograph is the latest of the National Bureau's efforts to make its analytical techniques and the related computer programs available to the research community. The first publication of this type was *Seasonal Adjustments by Electronic Computer Methods* by Julius Shiskin and Harry Eisenpress, originally presented in 1955 at a joint meeting of the American Statistical Association and the Econometric Society and later published by the National Bureau as Technical Paper 12. Another, *Electronic Computers and Business Indicators* by Julius Shiskin, appeared in 1957 as Occasional Paper 57. The authors of the present study presented a paper on "Applications of Electronic Computers to Business Cycle Research" before the annual meeting of the American Statistical Association in 1960. Milton Friedman's *Interpolation of Time Series by Related Series,* Technical Paper 16, 1962, which uses programmed regression analysis, should be mentioned in this connection. Also, about two dozen standard programs for economic analysis, developed or adopted at the National Bureau, are described in the mimeographed collection "Electronic Computing Memoranda."

We wish to acknowledge the sustained and generous support that our programming and data processing activities received from the International Business Machines Corporation, both in the form of grants of electronic computer time and of cash contributions. We are also grateful for assistance received from the National Science Foundation. We believe that the Bureau's computer operations provide an encouraging example of the fruitfulness of private and public support for the development of new techniques in the field of economic research.

The authors wish to express their appreciation for the personal encouragement and support they received in their general efforts, as well as in the preparation of the present study, from Geoffrey H. Moore. Only those who have received this support can fully appreciate its value. We also want to acknowledge the constructive criticism provided by other members of the staff, Philip Klein, Ilse Mintz, and Julius Shiskin. Thanks are also due to the Board of Directors Reading Committee, particularly Frank W. Fetter and Maurice W. Lee. Finally we want to record our debt to Sophie Sakowitz, who generously shared with us her rich experience in all matters relating to business cycle analysis.

Fred Howard and Virginia Meltzer edited the manuscript. Most charts were originally programmed for, and drawn by, the IBM–1130. H. Irving Forman improved the design, processed the charts for publication, and drew those charts that did not lend themselves to electronic plotting. We gratefully acknowledge their contributions.

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