

**COWLES COMMISSION FOR  
RESEARCH IN ECONOMICS**

**Monograph No. 11**

# COWLES COMMISSION FOR RESEARCH IN ECONOMICS

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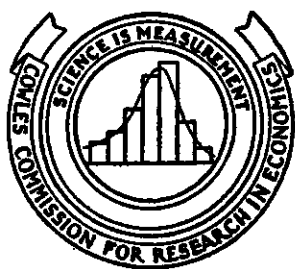
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ECONOMIC FLUCTUATIONS  
IN THE UNITED STATES  
1921-1941

*By*

LAWRENCE R. KLEIN



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## PREFACE

It cannot be overemphasized that this book contains only tentative and preliminary steps in econometric model building. It is the result of somewhat less than three years' work undertaken at the Cowles Commission for Research in Economics during the period 1944–1947. It is with all modesty that the research results are now presented in published form, and the main hope is that the work contained here may be of some help to other researchers in the field. If I were to begin today the project of reconstructing an econometric model for the United States, I believe that I would proceed somewhat differently, benefiting from knowledge of the weaknesses of the models in this volume. I would expect others to do the same.

The stated attempt here is to estimate laws of human behavior in economic life. If we reach the goal of discovering autonomous behavior patterns, we should expect them to hold under a variety of circumstances—for example, under both prewar and postwar conditions. Although I believe that the models presented in the ensuing pages give a reasonably good description of the prewar economic process, they do not carry over in all respects to the postwar situation. To some extent, I believe, the estimated behavior relationships do not take into account some variables which have not been quantitatively important in the past, but which have become more important in the postwar situation. On the other hand, some of the equations may even give a wrong picture of the prewar interrelationships among variables that were then important. But, on the whole, I feel that the prewar model is reasonably good; hence the title of this monograph.

The main weaknesses of the models in their applications to postwar phenomena are the *inadequacy of relations that serve to determine absolute price levels and household consumption*. The postwar price inflation and heavy consumer purchases seem to contradict the prewar relationships. Of course, to take only one problem for which econometric models may be used, postwar forecasting of economic aggregates should not be carried out by the mere extrapolation of models fitted to the prewar observations. For every forecast period the parameters of the model should be recomputed for all observations prior to the forecast period, and then extrapolations should be made from the newly estimated

models. This procedure is absolutely necessary because there are sampling errors in all the estimates and because it serves as a "troubleshooter" indicating the points at which the models break down. With a suitably dynamic forecasting technique, I believe that econometric models can be of great value; however, we have no published records of adequate scientific attempts. Then, too, there is a problem in connection with the statistical data of economics; they are constantly being revised and changed with respect to concept. The estimates of this volume are based on data that are already outmoded. It is highly desirable that the entire model be recomputed on the basis of the new national accounts of the U. S. Department of Commerce for prewar and postwar years. This has not yet been done.

Econometric research, with a few notable exceptions, has been based on a relatively small number of annual observations. In most instances annual observations for the interwar period have been the main source of information. There seems to be room for improvement in this respect, and that is another strong reason why I regard this volume as preliminary and tentative. At present some workers are studying time-series observations for 50 to 60 years in the past, and others, including myself, are studying quarterly or monthly observations for the interwar period and cross-section material (spatial rather than time variations) in order to get more refined estimates of fundamental behavior patterns. The end product of all this intensive research should eventually be an eminently more satisfactory econometric model. It is not a simple job, however, because quarterly or monthly data introduce difficult problems of the treatment of seasonal variation and high serial correlation of disturbances, and real difficulties are involved in the reconciliation of time-series and cross-section estimation results. Difficulties like these have not been faced in the present volume because it treats only annual time series of the interwar period; however, these perplexing problems cannot be avoided indefinitely if we are to get satisfactory econometric models.

I shall assume full responsibility for the contents of this volume, yet it was developed under a scheme of great mutual cooperation among economists and mathematical statisticians at the Cowles Commission for Research in Economics during the period 1944-1947. Numerous staff meetings and informal discussions introduced and conditioned many of the ideas herein expressed. Many outsiders in research, academic, and government positions also were of great assistance on many points, but they are too numerous to mention by name. I am especially grateful to Professor Jacob Marschak who introduced me to this research project and who served continuously as a guiding influence and as a moderator

on my more reckless ventures. Other Cowles Commission staff members to whom I owe a large debt of gratitude are T. W. Anderson, Jr., K. J. Arrow, G. Cooper, T. Haavelmo, L. Hurwicz, T. C. Koopmans, K. May, D. Patinkin, H. Rubin, and S. Tekiner. I profited very much by the reading of a set of critical notes on the manuscript solicited from E. D. Domar. S. Reiter gave valuable help in checking the time series used and the source references in the Appendix. R. B. Leipnik and B. A. de Vries prepared and supervised many of the statistical computations in which these time series were used for estimation of parameters and standard errors.

Thanks are due also to Mrs. Emily R. Strand, Publications Secretary in the Cowles Commission, to Mrs. Jane Novick, her successor, and to Miss Jean Curtis and Miss Virginia Atherton for their assistance in preparing the manuscript for publication.

L. R. K.

*New York City*  
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