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flicting interests as an effective means of retaining democracy in the governmental process.

Believers in economic law, or in simple solutions like either laissez-faire or the deficit spending formula, will get little comfort from this volume. The laissez-faire boys generally have already become pessimists who see America headed straight down the road to serfdom. The extreme Keynesians are already extreme optimists who seek only the authority to regulate the money switch. Commons' students are neither pessimists nor optimists. They are serious but not without hope, because they see nothing inevitable about serfdom, they have never had any illusions about the inexorability of the price mechanism, and know that the extreme Keynesians (not Keynes himself) are guilty of the part-whole fallacy. They know, also, that they have to work for the kind of economy they want—that it will not result from any automatic natural forces.

Agricultural economists who seek "to implement the search of mankind for liberty, security, justice and equality" cannot afford to be without this volume. It is the one to read first in order to become acquainted with Commons. Economists of the future will be reading it when most of the current products that represent a cultural lag from an outmoded past are forgotten. Besides the four parts, too briefly described in this review, the book includes: (1) A biographical sketch of Commons by Selig Perlman, (2) an editor's preface by Kenneth H. Parsons, (3) an appendix on Commons' Point of View, also by Parsons, (4) two additional appendices, and (5) an extended bibliography of Commons' writings. Finally, those who knew him will appreciate the excellent reproduction in color of his portrait by Christian Abrahamson, which is also included by virtue of the generosity of a friend of Commons.

*Bushrod W. Allin*

*Economic Fluctuations in the United States, 1921-1941.* By LAWRENCE R. KLEIN. John Wiley & Sons, Inc., New York. 174 pages. 1950. (Cowles Commission Monograph 11)

THE TITLE of this book is misleading, for the nonmathematical reader will not find a recognizable description or explanation of business cycles during the interwar period. Even the mathematically sophisticated are given little basis for appraising the significance of the author's complete model. Its relevance to the field of discourse of Schumpeter, Mitchell, Slichter, and Hansen is by no means obvious—primarily because the author himself does not indicate such a connection.

Actually, the book is an exercise in econometric model building. The first chapter is a very brief exposition of the Cowles Commission approach to economic analysis. The economic system is regarded "as describable by a set of simultaneous equations expressing all the inter-relationships among the measurable economic magnitudes which guide economic behavior." In addition to "endogenous" variables which are mutually determined at a given time, the system includes values of the same variables for previous periods and "exogenous" variables, which may be determined by "natural, technological, sociological, political, or institutional forces which are assumed here to be non-economic." In principle, the system as a whole

cannot be accurately described by calculating least-squares estimates of the separate equations. For one thing, different least-squares estimates are obtained for different choices of the "dependent" variable. Furthermore, unless we know a good deal about the other equations in the system and are willing to make some assumptions about the nature of the unexplained residuals or "disturbances," we shall not be sure whether an equation containing (for example) price and quantity variables is a demand curve, a supply curve, or some uninterpretable combination of the two. This is the "identification problem," which has received much attention from members of the Cowles Commission staff in recent years. The terminology is new and the current mathematical treatment more elegant, but the basic problem was well known to agricultural price analysts in the 1920's (see especially Elmer Working's article, "What do 'Statistical Demand Curves' Show?", *Quarterly Journal of Economics*, February 1927).

In view of these difficulties which are inherent in a single-equation approach, the author concludes that it is necessary to use a maximum-likelihood method of estimation which treats the set of equa-

tions as a unit and avoids the least-squares problem of choosing one variable in each equation as the "dependent." (The statistical theory underlying Klein's method of estimation is developed in Cowles Commission Monograph No. 10, to be reviewed in an early issue of this journal.)

The second chapter presents various hypotheses as to the major relationships involved in economic fluctuations and expresses them in mathematical form. There are sections on "The Theory of the Firm" and "The Theory of the Household." The mathematical formulations lay considerable stress on anticipated prices and profits as guides to economic behavior. In the statistical portion of the book anticipations are assumed to be functions of (recent) past levels and rates of change of the variables.

Chapter III takes what is (for this book) the final step of representing the variables of economic theory by statistical series and proceeding to estimate the "structural coefficients" of the equation system. These correspond to the net regression coefficients of the least-squares method. The final model of the U. S. economy contains 12 simultaneous equations in terms of 12 "endogenous" and 28 "exogenous" and lagged "endogenous" variables. Least-squares estimates of the same equations are also presented. At this point, the author dismisses the whole problem of interpreting his results with the following sentences.

"There are few general comments that can be made upon a comparison between the two different methods of estimating the parameters of Model III. It is left to the reader to form his own judgments on the comparison."

As the book is primarily an exercise in the use of a particular method of analysis, it should perhaps be reviewed only in terms of its method. A dispassionate discussion of the Cowles Commission method is contained in the *American Economic Review* (Vol. XXXIX, Nos. 3, May 1949, pp. 47-88) and a livelier one in the interchange between Vin- ing and Koopmans in *The Review of Economics and Statistics* (Vol. XXXI, No. 2, May 1949). This review confines itself to narrower observations:

(1) Much is made of the interdependence of the various elements of the economic system as a justification for the author's approach. However, of the 12 simultaneous equations, 7 contain only two

"endogenous" (mutually determined) variables; 4 contain three, and 1 contains a single "endogenous" variable. Thus, only 15 of a theoretically possible 132 "structural coefficients" between "endogenous" variables are considered important enough to measure. This makes the method more wieldy, but it also reduces the intuitively measureless gulf between single-equation and multiple-equation approaches to finite proportions.

(2) A comparison of these 15 structural coefficients with their least-squares counterparts shows more similarities than differences. Thirteen of them are within two standard errors of the least-squares net regression coefficients (10 of them within one standard error). Whether these differences lead to strikingly different conclusions about business cycles the author does not say. The reviewer is led to conclude, however, that least-squares estimates will approximate "structural coefficients" within the limits of sampling error in a good many (but not all) practical situations.

(3) The author's method shares almost all of the problems of the single-equation approach, including choices of variables, functional forms, and methods of dealing with trends and serial correlation. Moreover, as the author points out, "multicollinearity was and still is a problem. When several economic variables move together in the same general time patterns, we shall not be able to measure their separate influences in the equations of the system." As business cycles are measured and identified by the fact that a great many economic variables move together in the same general time patterns, this problem is here to stay. Its importance may be reduced in some cases in which the significant relationships can be stated in terms of year-to-year changes rather than original values of the variables. This possibility is not discussed.

The book will be of primary interest to a limited audience of mathematical economists and econometricians. Klein himself is one of the ablest young econometricians in the country, and his book (written mostly during 1944-47) gives ample evidence of the fact. The book's main shortcoming is its failure to interpret the statistical results in a way which would gain it a broader and more sympathetic audience and establish it as a substantive contribution to business-cycle analysis as well as a methodological experiment.

Karl A. Fox