

## V

In summary we believe that insofar as econometricians wish to be of more service to policy-makers, the following redirection of effort is called for:

1. More attention needs to be directed at determining the impact of those variables which might actually be used for control purposes.

2. More study should be given to the continuity properties of economic time series. This type of study is needed as a basis for specifying what kind of lags can be tolerated in the impact of instruments of control or policy actions.

3. A vigorous effort should be directed at discovery of exogenous variables and of as

complete a specification as possible, of their impact. Not only do the policy implications of econometric models depend critically on the selection of exogenous variables, but the specification of the estimation processes used also depends upon a proper selection of exogenous variables.

4. Insofar as possible, exogenous variables which move independently of one another should be sorted out but, insofar as the chosen exogenous variables are interrelated, these interrelations must be investigated before an econometric model can be very useful to the policy-maker.

## COMMENTS

## I

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DR. ORCUTT has selected a very useful and appropriate model for the discussion of economic policies. His model expresses what A. P. Lerner has called the "economics of the steering wheel."<sup>2</sup> In order to keep the car on the road, it is not necessary to be able to predict, with great accuracy and for a long time ahead, the course the car will follow if the steering wheel is held in a fixed position. Rather, it is sufficient if one can observe departures from the middle of the road, and respond quickly to such observations with changes in the position of the wheel that return the car to the middle of the road. The position of the steering wheel stands for a *controllable* (or *instrumental*) variable,<sup>3</sup> that is, a variable which can be given any value (within a certain range) by the implementation of a policy decision. The proximity to the middle of the road stands for the *objective* variable which is a gauge of the success achieved by the policy.

<sup>1</sup>I am indebted to J. Marschak and H. A. Simon for valuable comments on an earlier draft of this note.

<sup>2</sup>A. P. Lerner, *The Economics of Employment* (New York, 1951), see ch. I.

<sup>3</sup>The term "controllable exogenous" variable has been used by J. Marschak (*Statistical Inference in Dynamic Economic Models*, ch. I, section 1.2.3.2); the term "instrumental" variable by J. Tinbergen in what seems to me the same meaning.

## I

I find myself in full agreement with Orcutt's proposal that instrumental variables should be incorporated explicitly in econometric models. Nor do I believe that Orcutt and I stand isolated on this point. The same idea can be found in Klein's work,<sup>4</sup> and the use of econometric models to discuss the effects of policies has been developed into a fine art by Tinbergen.<sup>5</sup> It is, I believe, in the best tradition of econometrics to regard econometric model construction as an aid in the discussion of policies. The principal objective is to make

<sup>4</sup>See, for instance, "The Use of Econometric Models as a Guide to Economic Policy," *Econometrica*, April 1947, reprinted as Cowles Commission Paper, New Series, No. 23, in particular p. 112, pp. 138-39.

<sup>5</sup>J. Tinbergen, "Der Einfluss der Kaufkraftregulierung auf den Konjunkturverlauf," *Zeitschrift Für Nationalökonomie*, 1934, pp. 289-319. "Quantitative Fragen der Konjunkturpolitik," *Weltwirtschaftliches Archiv*, November 1935, pp. 366-99. "Über die Sekundärwirkungen zusätzlicher Investitionen," *Weltwirtschaftliches Archiv*, January 1937, pp. 39-57. "Conjunctuurpolitiek en Internationale Verhoudingen," *De Economist*, 1937, pp. 81-107. *An Econometric Approach to Business Cycle Problems*, Paris, 1937 (see ch. III). "On the Theory of Business-Cycle Control," *Econometrica*, January 1938, pp. 22-39. *Business Cycles in the United States of America 1919-1932*, League of Nations, Geneva, 1939. *Business Cycles in the United Kingdom 1870-1914*, Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, AFD. Letterkunde (Amsterdam, 1951), ch. 9.