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Introduction: Input–Output Analysis and Classical Economic Theory

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Input–output analysis has its roots in classical political economy, that is, the writings of William Petty, Richard Cantillon, François Quesnay and the physiocrats, and the English classical economists from Adam Smith to David Ricardo. This has repeatedly been stressed by Wassily Leontief, whose main concern was the empirical implementation of the old classical view of the economy as a circular flow. The classical approach to the theory of production, value and distribution has been revived more recently by Piero Sraffa whose 1960 book *Production of Commodities by Means of Commodities* has triggered a rich literature on conceptual, theoretical and doctrinal aspects of analyses dealing with economic systems characterized by a sophisticated division of labour and complex interrelationships in production.

At the Twelfth International Conference on Input–Output Techniques, held in New York, 18–22 May 1998, a special session, organized by one of the guest editors of this issue, was devoted to the theme 'What can input output learn from "classical" economics?'. The idea was to take stock of the recent developments in the theory of production, distribution and growth, trace the basic ideas entertained back in the history of economic thought, and relate modern classical theory to input–output analysis. In this way, the ground was meant to be laid for a fruitful communication between input–output analysts and advocates of the classical approach, with the potential of a cross-fertilization of their respective ideas.

The present volume contains the revised versions of the papers presented in the special session plus William J. Baumol's address delivered to the meeting of the International Input–Output Association. Baumol's paper fits neatly into the general format of the special session. We are grateful to Professor Baumol for having allowed us to include his piece in this volume.

The composition of this issue is the following. *William J. Baumol* deals with the characteristic feature of Leontief's analysis, which distinguishes it from the contributions of Quesnay, Marx and von Bortkiewicz; namely, Leontief's transformation of a purely theoretical analysis into an economic tool that can be used in empirical work and serve as the basis for economic policy. *Heinz D. Kurz & Neri Salvadori* show that input–output analysis can look back at a formidable history prior to its proper inception.

The historical view provides some new vistas on the potentialities of input–output analysis. It is argued that many of the problems that figured prominently in the work of earlier authors, but which for practical reasons are set aside in conventional input–output, can be addressed with the help of the sophisticated

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analytical tools provided by modern classical theory of production. *Albert E. Steenge* has a fresh look at Quesnay's *Tableau Économique* and suggests a reinterpretation, placing special emphasis on the treatment of rents in the physiocratic scheme and the view that only agriculture is productive. *Christian Gehrke* assesses Alfred Kähler's 1933 contribution to an analysis of the displacement effects of workers by machines. He shows that the multisectoral model developed by Kähler anticipates, in important respects, later input–output studies of 'technological unemployment' and even discusses, albeit in rudimentary form, the ubiquitous problem of the choice of technique. *András Bródy* turns to the problem of the circulation of money and models it as a Markov chain. He derives a special multiplier that can be interpreted as expressing the view entertained by David Hume in his essay 'Of Money'. Some justification of Hume's view is provided as to why the propagation of a monetary injection into a given economy is a transitory phenomenon. *Ian Steedman* points out that 'value-based' input–output coefficients reflect not only the physical conditions of production but depend also on domestic income distribution, on world prices and on tariff rates. This is true, in particular, of 'value added input coefficients': in their case it is hard to see what, if any, physical input they might be held to refer to. *Christian Lager* compares different conceptualisations of production and prices and the role of time therein. He demonstrates that the analytical framework of von Neumann and Sraffa is rather general and comprises, as special cases, the neo-Austrian model of Hicks and the flow-fund model of Georgescu-Roegen. In addition, he points out some difficulties with regard to observable input–output coefficients and suggests, as an alternative, a method to determine the coefficients for general flow-input flow-output processes. *Heinz D. Kurz & Neri Salvadori* relate (a variant of) the dynamic Leontief model to a special class of 'new' growth models, that is, models that determine the steady-state rate of growth 'within the model' rather than, as in the Solow model, by some exogenously growing variables. In this perspective the Leontief model emerges as an endogenous growth model.

Input–output analysis is first and foremost a tool to do empirical research; its analytical sophistication is constrained by the availability of data. Contributions to economic theory are typically not concerned with data problems and therefore often involve degrees of sophistication which either cannot be translated into applied work or can be translated only in a very unsatisfactory form. This gap between economic theory and what can be done empirically is also felt in the present volume. However, we are convinced that the gap is larger than necessary. While the application of concepts and ideas presented in this volume in sensible empirical studies is beyond the scope of this enterprise, we hope that the papers will stimulate work narrowing the gap.

We should like to thank the editor of *Economic Systems Research* for kindly inviting us to edit the proceedings of the special session; the contributors for their collaboration; and the colleagues assisting us with the refereeing process. May a cross-fertilization of input–output and classical ideas take its course.