Macroeconomic Models
in a Causal Framework

Geoffrey J. Wyatt

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Preface

The purpose of this book is pedagogical, in the widest sense. It will have achieved its aim if it persuades readers of the usefulness of a causal, graphical representation of economic models, and encourages them to formulate and write down economic models in flowgraph representations. The graphical techniques presented here complement the traditional representations of economics by adding an explicitly causal perspective. I believe a causal perspective deepens our appreciation and understanding of the models we use in economics.

Macroeconomics is a natural application area for this approach because it is a system science: it comprises linked components, *i.e.* interacting markets, institutions and government policies. Models which represent all these elements are necessarily complex and open to various interpretations depending on what is considered to be exogenous or endogenous. In fact those very words already contain the notion of causality, so an explicitly causal approach is quite appropriate.

Who should read this book? Well, I would say anyone who wants to learn more about macroeconomic models. It can accompany and complement most textbooks in macroeconomics,[†] though it is not itself a macroeconomics textbook. It does not try to cover the gamut of macro economics, and in particular does not examine modern optimising representative agent models. Nor does it examine factor markets, though a causal approach is quite applicable there too; nor economic growth. But, used as an accessory or supplement to an intermediate macroeconomics textbook, students will find a new perspective on many of the models presented there, and perhaps discover some unexpected implications. The book should also be useful to those engaged in the formulation or analysis of fiscal and monetary policies, by providing new ways to understand and explain their effects.

[†] Such as, among the many excellent texts now available, those by: Mankiw; Dornbusch, Fischer and Startz; Hall and Taylor; Blanchard; Burda and Wyplotz; and De Long.

The material in this book has been used as the core of a class in macroeconomic modelling for some ten years now, and I am grateful to the many students and class tutors who have enabled me to refine my ideas, and occasionally brought me down to earth, over that period of time. That class follows a standard intermediate level macroeconomics class, but it does not build on it in the sense of starting where the earlier material left off. Rather it goes back over the now familiar ground again *ab initio*, but using the flowgraph representation. That may be why it has also been a successful vehicle for teaching macroeconomics to MBA students, especially those with a background in engineering.

The level of mathematics needed to master the material presented here is no more than is usually assumed for a class in intermediate macroeconomics; in other words, the basic algebra of linear equations together with some understanding of the basic concepts of differential calculus. In fact only basic algebraic manipulations are needed to solve flowgraphs in this book. But certain presentational decisions were made to keep things simple. In particular it was decided to employ a discrete time formulation for dynamic models, using the lag operator, and then only to consider two aspects of model solutions, namely immediate effects and long-run effects, ignoring the transition path between these states. This meant that the whole apparatus of Laplace- or z-transforms could be avoided. Although transitional dynamics arise naturally in engineering, it is of much less relevance in economics which has rather little to say about disequilibrium.

Long before I had the opportunity to teach this material I doodled with flowgraphs, learned from colleagues in control engineering, simply as a means of explaining macro models to myself. It was only when I came to use them in seminar settings that I appreciated that other people, students and colleagues, could also use them to advantage. That is why I began to teach macroeconomics in this way, and why I have written this book: behold the models!

Geoffrey Wyatt
Edinburgh
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