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Book Reviews

Paul De Grauwe, Hans Dewachter, and Mark Embrechts, Exchange Rate Theory: Chaotic Models of Foreign Exchange Markets (Oxford: Blackwell) ISBN# 0-631-18016-8, 1993.

Edward Lorenz's discovery of chaos in his model of the climate, as related in James Gleick's (1987) book, merits a place in the pantheon of scientific accidents alongside penicillin and x-rays. In the 30 years since Lorenz's (1963) work appeared, nonlinear analysis has made its mark on a dazzling number of disciplines. In the late 1970's, these ideas began to filter into economics. The contribution by De Grauwe, Dewachter and Embrechts is a wide ranging treatment on chaotic dynamics in foreign exchange.

The authors begin with some reference material on chaos in Chapter 1, including simple dynamical systems like the Lorenz equations, the Henon map, and the logistic equation. They next turn to fractals and define a generalized version of dimension (Hausdorff) appropriate for strange attractors.

The next chapter turns quickly to exchange rate theories. They introduce the 'news' model that implies random walk behavior for the spot exchange rate. Their structural models include the Dornbusch sticky price model and the portfolio balance model. Some empirical testing by the authors as well as a review of the literature leads to the conclusion that all of these theories have serious shortcomings.

The 'simple' chaotic model is introduced in Chapter 3. It has an ad hoc motivation relying on two classes of market participants which they call 'chartists' and 'fundamentalists'. Chartists look at price patterns and movements while fundamentalists look at economic variables like the money stock. The dynamics are driven by a weighting of the beliefs of the two types of traders. This takes a quadratic (logistic) form which only a naive reader would assume was chosen randomly. Through simulation and some statistical analysis, it is shown in both chapters 3 and 4 that the model produces chaotic dynamics for a range of parameter values. The chaotic patterns in simulated time series the model produces are offered as possible explanation for the apparent random walk behavior of the spot exchange rate.

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A more elaborate model with money is introduced in Chapters 5. In the monetary economy, PPP, interest parity and goods market clearing are incorporated as features of the equilibrium. Nevertheless, the dynamics are again driven by the interaction of the weighting function. I found much more interesting the way in which the expectations of the chartists induced forward discount rate bias.

In Chapter 6, the authors return to methods for detecting chaotic dynamics in time series data. They discuss delay time reconstruction and the correlation integral which are standard methods to estimate the dimension and entropy of a dynamic system. (See Mayfield and Mizrach (1991) for some technical considerations involving dimension and entropy calculations and Mayfield and Mizrach (1992) for an application to stock prices.) The rescaled range analysis of part 5 is an attempt to look for long term persistence in the data.

In chapter 7, these techniques are applied to exchange rate data. I would have preferred to see this material at the beginning to help motivate the theoretical work though. The authors find evidence of a low dimensional chaos in the British Pound/U.S. Dollar (US$) and Japanese Yen/US$ exchange rates but not in the German Mark/US$ rate. In Chapter 8, the authors are content to simply look for nonlinearities. They use the Brock, Dechert and Scheinkman (1987) test, and a frequency domain procedure advocated by Hinich and Patterson (1985). At high frequencies, they find nonlinearity in a number of rates, but not at monthly returns. A conclusion calls, not surprisingly, for further research.

My principal criticism of this and related work can be made by analogy to Lorenz. Lorenz's model was built to replicate observed weather patterns. Chaos was merely a fortuitous by-product. The author's effort begins with the opposite motivation. They build a model which is designed to have chaotic dynamics, and then try to match time series on exchange rates. This approach has two flaws in my opinion. First, the chaotic dynamics arise from ad hoc features of the model. Second, there is not much effort to show that the parameter ranges that generate chaos are in any way plausible. A calibration exercise in the spirit of the real business cycle school seems called for.

A few minor points as well. The mathematics is a bit imprecise in several places. A few examples will suffice. The author's definition of chaos (p. 34–35) is non-standard including two components beyond the usual notion of sensitive dependence: (i) fractal dimension; and (ii) a continuous broadband power spectrum; neither is required for seemingly random dynamics. An attractor (p. 43) is not the trajectory of the dynamical system itself, but a set to which all trajectories are drawn. The presence of a strange attractor (p. 51) does not tell us the total number of Liapunov exponents. They will be defined for each dimension of the state space, etc.

These minor quibbles aside, the book by De Grauwe, Dewachter and Embrechts will likely introduce the exciting and useful tools of nonlinear analysis to a new audience, and for that alone, the authors are to be commended.

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Victor Fuchs, *The Future of H*
1993) pp. ix + 255.

For an economist interested
Victor Fuchs' book is a treat.
connections between complex

The Future of Health Polic
essays on health economics.
several of his previous article
an electric mix of topics. Th
issues, empirical studies and
to treat the distinction betwee
technology assessment.

The section on conceptua
what health economics ought
Fuchs raises several measur
indices, and the pros and cor
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between health and poverty.

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knowledge of lessons beyor
and the U.S. are so different
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Victor Fuchs, *The Future of Health Policy* (Harvard University Press, Cambridge, 1993) pp. ix + 255.

For an economist interested in health care but not steeped in its history, reading Victor Fuchs' book is a treat. It puts many issues in context and makes logical connections between complex issues. His arguments are compelling and insightful.

The Future of Health Policy covers a broad range of topics through a series of essays on health economics. Fuchs indicates that the volume is a collection of several of his previous articles and lectures, which helps to explain why it offers an electric mix of topics. The book is divided into three sections – conceptual issues, empirical studies and policy analysis. The topics covered range from how to treat the distinction between mental and physical health to new ways to look at technology assessment.

The section on conceptual issues devotes considerable time to a discussion of what health economics ought to address and how to think about issues in this area. Fuchs raises several measurement issues such as determining appropriate health indices, and the pros and cons of using input versus output measures in evaluating health policies. The section concludes with an examination of the relationship between health and poverty.

The second section on empirical studies includes two analyses of the Canadian system, and a chapter each on reproductive issues and children's health care. Fuchs does not just present statistical results; for example, he draws on his broad knowledge of lessons beyond neoclassical theory to put the issues of why Canada and the U.S. are so different in context. The last section of the book turns to policy analysis. Chapters cover cost containment, the 'competition revolution', and the health care 'counterrevolution'. The book concludes with an analysis of technology assessment and predictions about the chances for health care reform.