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Book reviews

Spatial Economic Science: New Frontiers in Theory and Methodology. Edited by AURA REGGIANI
(Berlin: Springer, 2000). [Pp. xi + 457]. ISBN-3-540-567493-4. Price EUR 99.95, hardback.

This book is based on papers presented at the 1998 summer meeting of the European Regional
Science Association. Although the papers are cast as 'spatial economic science', it is more
convenient to think of them as a modern rendition of 'regional science', developed largely in
North America, and latterly in Europe, from the 1950s on. In fact, the editor, Aura Reggiani,
sets the context by posing a broader question as to the nature of regional science and the
need to develop its theory and practice in terms of contemporary ideas of simulation, complex-
ity, dynamics, and evolution. These, she argues, define the new frontier of the subject. Several
key contributors to the field and their distinctive contributions are collected together in this
book which is organised into four sections: the frontier based on developments in modelling
and simulation; spatial policy analysis and decision-making; temporal dynamics and spatial
structure; and finally transport. In a way, like all partitions of a field which is largely
methodological, there is considerable intersection between the themes and there is always an
argument about how far various papers might be in one section or another. But in general
the organisation is robust and the classification meaningful.

In a wider context, I would argue that regional science originally based on a concern for
injecting space into economics, has fallen on bad times. We live in a time of immense change
in comparison to the years when regional science was first fashioned and this, together with
the idea that individual, disaggregate rather than collective, aggregate thinking must be the
driving force for true knowledge in the social and economic sciences, have combined to
marginalize the discipline. In a sense, this volume is refreshing because it is clear that regional
science is beginning to wake to the sounds of these new drums, and to adapt to newer ideas
which are somewhat more pragmatic, less theoretically self-conscious while at the same time
being both rigorous and consistent. Since the contributions in this volume were originally
conceived, at least five years ago now, these echoes have become stronger and louder and the
concern for more decentralised, dynamic approaches to cities and regions has broadened and
deepened. For this reason alone, the book is worth looking at. Moreover for research in GI
science, the themes here resonate quite well with the tenor of typical papers in this journal.

To the volume itself then. In the first section that deals with theory and models, Alan
Wilson, the doyen of spatial interaction theory and the gravity model, paints an interesting
picture of how new developments in complexity theory posed as conceptual, mathematical
and computational challenges, can be used to reinforce traditional theory. Ken Button then
takes a more direct strike at the now not so 'new' urban economics, the application of micro-
economic theory and general equilibrium models to cities developed in earnest some 20 or
more years ago. The essential problem in these models which were embraced by regional
science, was on simplification of the city to a monocentric form. Despite various tamperings,
Button shows how this field has almost disappeared as more pragmatic growth theory
approaches to urban and regional systems, built around complexity theory by economists
such as Paul Krugman, have virtual replaced them.

Dave Batten then presents a rather grander synthesis of these ideas through the network
paradigm which enables dynamic change through phase transitions and the emergence of
complexity itself, to be characterised in terms of the growth of urban and regional systems.
Agents and criticality dominate his discussion and although somewhat lengthy, he succeeds
in redirecting our focus to somewhat richer theory. These ideas are given another twist by
Günter Haag who shows how traditional and new theory incorporating space and temporal

dynamics can be extended using Herman Haken's master equation approaches. Manfred Fisher then reviews how neural net approaches which deal with structures much nearer the basic data, can enrich traditional interaction modelling, while Peter Nijkamp, Piet Rietveld and Laura Spierdijk conclude this section with a useful review of diverse classification methods ranging from cluster analysis to neural nets and rough sets.

The second part of the book includes papers based on methods for decision-making. The inevitable Peter Nijkamp begins this again with a chapter on comparative assessment through various multi-criteria methods which involve, regime, flag and rough set theories. Yee Leung, himself a master of decision support modelling, continues Manfred Fischer's early theme on neural nets with a useful review of hybrid connectionists model for spatial inference which involve evolutionary optimisation and genetic algorithms. Jean-Claude Thill and Aaron Wheeler discuss more inductive procedure based on decision tree characterisations of transport behaviour while DeTombe concludes this section with a discussion of group problem solving procedures based on the COMPRAM methods. In part three, the emphasis swings back to formal modelling with interesting chapters on the dynamics of urban decline by Donaghy, spatial heterogeneity in land prices in Copenhagen using Casetti's expansion methods by Kristensen, an exploration of the gravity coefficient in retail spatial interaction models by Baker, and the application of block modelling, invented by social network theorists, to input-output models by Cooper.

The last part of the book returns to the theme of transport which is never far from the surface of regional science with a paper by the Reggiani, Nijkamp and Sabella on evolutionary methods in spatial logit models. The connectionist theme is continued by Jean-Claude Thill and Mikhail Mozolin in an evaluation of feedforward neural nets in spatial interaction modelling. Meneguzzer then explores a much more detailed problem of user equilibrium in terms of traffic signals control, and Bielli, Carotenuto and Confessore develop a hybrid approach to network design. The last chapter by Schintler and Kulkarni returns to the earlier theme of complexity theory by developing models of transport systems using small world theory which has become extremely popular in the analysis of all kinds of social and physical systems which show network organisation at the edge of chaos.

All in all, the papers collected here are interesting and informative but readers hoping to get an overview of contemporary regional science will be a little disappointed. The focus is more on rather specialised developments in the field which pick up on modern statistical and mathematical methods than on a general overview. Nevertheless, the is much to ponder here and although the emphasis on space in modern regional science is still largely aggregative and abstract, the focus on networks and relations should give experts in GIS something to think about. Many of the methods and models presented here would be difficult to operationalise using contemporary GI systems. If only because of this, experts in GI should look at the book for this is as good a summary as one would find of the way regional scientists theorise about space in their own field.

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