BOOK REVIEWS

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Understanding and Interpreting Economic Structure, edited by Geoffrey J.D. Hewings, Michael Sonis, Moss Madden, and Yoshio Kimura. 1999. Advances in Spatial Science Series. Berlin and New York: Springer. 370+x. $99.

The title of this book is too vague. Its papers build on Miyazawa's multiplier analysis. The basic idea is a variation on Leontief's theme of a multiplier capturing total requirements. If A is a matrix of structural coefficients, then $(I - A)^{-1} = I + A + A^2 \ldots$ is the so-called Leontief inverse; it sums in effect the direct requirements and the indirect requirements. If you do not like this stuff, quit, as the book is of no interest to you.

Now suppose A is partioned as follows.

$$A = \begin{pmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{pmatrix}$$

The two main instances of such a decomposition that Miyazawa and the contributors to this volume study are interregional input-output analysis and income formation analysis. In (inter)regional analysis, A_{ii} are the input-output matrices of regions i and A_{ij} $(i \neq j)$ are the import coefficients matrices of regions j. In income analysis A_{11} is the input-output matrix, A_{21} the valued-added coefficients matrix, A_{12} the consumption coefficients matrix, and $A_{22} = 0$. In either case the idea is that the inclusion of interdependencies

The Book Review section of the *Journal* benefits from a financial contribution by Williams College.

Blackwell Publishers, 350 Main Street, Malden, MA 02148, USA and 108 Cowley Road, Oxford, OX4 1JF, UK.

with the other economy (region 2 or the household sector, respectively) generates further multiplier effects. In other words, the first quadrant of the Leontief inverse of A will be the Leontief inverse of A_{11} plus "something" and the question is what "something" is in terms of the A_{ij}.

Michael Sonis and Geoffrey Hewings give the answer:

$$(I - A)_{11}^{-1} = (I - B_1 A_{12} B_2 A_{21})^{-1} B_1$$

where $B_i = (I - A_{ii})^{-1}$. The ordinary Leontief multipliers, B_1, are boosted by the Leontief inverse of $B_1A_{12}B_2A_{21}$. The overall multiplier is thus seen to be the product of the "external" and the "internal" multiplier. In case of the off-diagonal multipliers, $(I - A)_{ij}^{-1}\ (i \neq j)$, a third factor emerges, B_iA_{ij}, which is the "interregional" effect. The editors of the book find this decomposition of the overall multipliers advantageous, simply because it suggests intra- versus inter-subsystem effects.

The decomposition of multipliers is useful, but for another reason. Let me first explain why I distrust the decomposition in "internal" and "external" multipliers. If block 1 changes (a change in A_{11}), then not only the internal, but also the external multipliers of block 1 are affected. What matters is the overall effect on $(I - A)_{11}^{-1}$; the division between "internal" and "external" components is an artificial scheme that reflects the taste of the analyst rather than the source or destination of structural change. No, to appreciate the use of the above formula we must move ahead in theory. The first "application" is by Leontief himself, who called $(I - A)_{11}^{-1}$ consolidated coefficients and proposed them as an alternative to aggregation in the 1960s. Recently, Ed Wolff and I used consolidated coefficients to model outsourcing of services by manufacturing and to investigate the contribution to productivity growth. Unfortunately, the contributors to this volume are unaware of the concept of consolidated coefficients. The second application is in income analyses, where $A_{22} = 0$ adds structure that can be exploited. Denoting the matrix of coefficients by M instead of A (to honor Miyazawa), we start with

$$M = \begin{pmatrix} A & C \\ V & 0 \end{pmatrix}$$

where the input-output, value-added, and consumption coefficients matrices are now denoted by A, V, C, respectively. The first quadrant of the Leontief inverse of M is now denoted by Δ. The multipliers in Δ capture the requirements induced by household consumption on top of the usual interindustry demands. The authors correctly state, but do not prove, Miyazawa's fundamental equations of income formation,

$$V\Delta = (I - VBC)^{-1}VB$$

$$\Delta C = BC(I - VBC)^{-1}$$

This is neat. Unfortunately, the use is not emphasized in the book, so let me illustrate it. As is known, premultiplication of a Leontief inverse (Δ) by value-added coefficients (V), yields income multipliers. Now suppose there is only one income class. Then V is a row vector and C is a column vector, so that VBC is scalar; in fact, it is the Keynesian propensity to consume, and, therefore, the first Miyazawa equation shows that all traditional income multipliers (VB) are boosted by a common scalar, namely the

Keynesian multiplier. The latter macroeconomic concept is thus provided a microeconomic foundation. The exact proportionality of traditional and total income multipliers was discovered in Leontief's school in the 1960s by Sandoval.

Yoshio Kimura and Hitoshi Kondo provide some useful coefficient conditions that ensure the existence of a nonnegative Leontief inverse, in terms of A_{ij}. Roughly speaking, if units do not spend more than a dollar to produce or consume a dollar, one is on safe grounds. This condition is not invariant with respect to the units of measurement and, therefore, not necessary. They also consider convengence properties of the Neuman series development of the Leontief inverse, but this does not turn me on, for multipliers computation along this line is numerically inefficient.

The middle portion of the book contains four papers at the interface of applied theory and empirical application. Peter Batey and Moss Madden consider the application where block 1 represents the "economy" and block 2 the "demography." Economic variables are employment by sector and demographic variables are unemployment, retirement, and migration. The application seems natural, but the choice of exogenous variables is a bit odd. The latter include employment by sector. Tateo Ihara reinterprets Miyazawa's multiplier analysis using the concept of an augmented input coefficient. The author cites Leontief, but unfortunately not his aforementioned alternative to aggregation, which accomplished the same a long time ago. Yasuhide Okuyama, Michael Sonis, and Geoffrey Hewings apply the apparatus to a two-regions model of Japan, while Andrew Trigg focuses on the income formation case. Since the propensity to consume and the share of surplus value sum to unity, the Leontief-Keynes multiplier analysis is provided an interesting Marxian interpretation.

The remainder of the book comprises ten assorted applications of multiplier analysis all over the world. Following the guidelines of the editor to concentrate on the most important essays, I do not review them, but address the issue of the sense of the volume. The self-proclaimed objective of the editors is to honor Professor Miyazawa. I think they succeeded. Frankly, I was hardly aware of Miyazawa's work and appreciate the crisp presentation of total multipliers in terms of intra- and inter-subsystem coefficients. Conversely, however, Miyazawa and followers seem unaware of the related work by Leontief and his students. I think Miyazawa's framework has indeed the potential to compare a variety of themes, including Leontief's aggregation theory, Sandoval's and other input-output multiplier results, and current work on productivity measurement. Consider it a compliment.

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Valuing the Built Environment: GIS and House Price Analysis, by Scott Orford. 1999. Aldershot, U.K. and Brookfield, Vermont: Ashgate. 216 + xv. $69.95.

Housing (land and improvements) is unlike other commodities. Once we view it as a complex, differentiated bundle of goods and services, housing has a multitude of qualities that must command our attention. David Harvey (1973) spoke for an entire generation of urban analysts when he identified many of these special features of housing in *Social Justice and the City* nearly thirty years ago. Harvey pointed out, among other things, that dwelling units usually occupy fixed locations, that their turnover rate is typically slow but their life expectancy is typically long, and that most dwelling units