Regional Economics To Regional Science: Evolution Or Odyssey?#

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I

The history of regional economics is relatively short. Its highlights are covered adequately in thirty pages of Isard's *Location and Space Economy.*[1] The history of regional science is even more abbreviated.[2] As an organized discipline, it is a little more than a quarter of a century old. Isard's hope, when he and a small number of supporters established the Regional Science Association, was to launch a new *discipline*, not just set up another interdisciplinary or multidisciplinary organization.

The precursors of regional science were economists such as Hoover, Dean, and Garnsey, who wrote about regional issues before Isard had broached the idea of regional science as an amalgam of earlier disciplines.[3] What I propose to discuss is the transition from conventional economics, including the small branch which dealt with regional matters, to regional science. And I begin with a question: Has it been a linear evolution, or does the transition more nearly resemble the wanderings of Odysseus before he finally returned to Ithaca a decade after the end of the Trojan War? The answer, I suspect, is partly implied by the title.

II

There would have been no point in establishing a new discipline called regional science if it were not to be differentiated in some way from economics. Papers presented to early annual meetings—the first published in 1955—were characterized by diversity of topics and disciplines represented. Among the contributors were geographers, demographers, planners, political scientists, an occasional historian, resource economists, and of course regional economists. This is true of recent issues of the *Papers* as well, but a cursory review suggests that there have been a preponderance of articles by economists.[4] Most of the papers deal with spatial issues, but some might have been more appropriately published in a conventional economics journal than in a regional science publication.

Conventional economics, excluding urban and regional economics, deals with spaceless phenomena.[5] Regional science focuses on spatial systems.

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#Southern Regional Science Association Fellow Address, Knoxville, Tennessee, May 31, 1982.

Another difference between regional science and economics can be illustrated by a medical analogy. Regional scientists are interested in the anatomy (or structure) as well as the physiology (or functioning) of spatial systems. Conventional economists are interested in the way an economic system operates, rather than the way it is put together.[6] The emphasis on structure helps explain the interest among regional scientists in linear systems, especially input-output and linear programming models.[7]

Since regional scientists are interested in both the structure of spatial systems, and the ways they function, one might be tempted to conclude that regional science has a broader focus than conventional economics. The reverse, however, is probably true. Regional scientists have little interest in monetary analysis, for example, since regions do not have independent monetary systems or policies. And monetary analysis continues to be the central concern of many conventional economists.

In spite of the differences noted above, however, it is easy to exaggerate the differences between contemporary *regional* economics and regional science. Most of the textbooks in the field are still labeled "regional economics." In fact, there is only one well-known English-language regional science text, Isard's *Introduction to Regional Science*.[8] And his book deals primarily with economic concepts, issues, and models. It does not follow the holistic approach which he and others propounded during the early days of the Regional Science Association.

III

As in conventional economics, there has been a strong drift in recent years toward the construction of econometric models by regional economists and regional scientists. They fall into two groups: regional models, which are small-scale versions of national models, and multiregional models, which view the national economy in terms of its constituent regions.[9] These models can be divided into two further subsets: (a) input-output, and (b) small-scale versions of macro-econometric models. The latter are not mutually exclusive; at least one major effort has been made, by the late Wilford L'Esperance, to "conjoin" a state input-output and a state econometric model.[10]

My views about developments in regional and multiregional modeling are discussed elsewhere, and because of space limitations only a summary is given here.[11] Most of the early models were of the input-output variety, and a number were limited to individual states or smaller areas such as counties or communities. The first attempt to develop a multiregional model in the U.S., based on survey data, was the Colorado River Basin study of the early 1960s.[12] The best-known, and by all odds the most comprehensive, effort to develop a national, multiregional input-output model (MRIO) is the one conducted by Polenske.[13]

Tiebout's 1957 article launched a running debate in the regional science literature about regional and interregional input-output models.[14] Tiebout had a number of legitimate doubts about the usefulness of the regional

tables that had been published when he wrote his critique. His objections were based on the implicit assumption, however, that all regional tables would be constructed by "adjusting" national coefficients. They do not apply to survey-based regional or interregional tables.[15] There can be no disagreement, in my view, with Tiebout's basic point; namely, that no one has yet developed a satisfactory method for disaggregating national coefficients to obtain acceptable regional counterparts.

Much, although certainly not all, of the controversy surrounding regional and interregional input-output analysis would be settled if all state tables were of the "bottom-up" variety. Establishments could report transactions, including interstate and foreign transactions, to the U.S. Department of Commerce. The latter could construct a set of internally-consistent state tables, and aggregate them to get national transactions tables.

There appears to be less interest in the construction of regional and interregional input-output tables in the United States than there was a decade or so ago. But there has not been a corresponding decline in the development of short-cut methods for calculating disaggregated input-output type multipliers. Even where tests show such multipliers to be reasonably close to those calculated from full input-output tables, however, they are not adequate substitutes for the tables themselves.

Input-output tables can be used for analytical purposes other than simple impact studies—long-range forecasting, and various types of simulation, to mention only two. But the cost of constructing survey-based tables, in both time and money, and the acknowledged weaknesses of those derived from national data, have no doubt contributed to a relative shift in emphasis in the U.S. from input-output analysis toward the construction of conventional econometric models.

Most regional econometric models—as is true of the national models which they replicate on a smaller scale—are based on Keynesian and Neo-classical principles, although most include—explicitly or implicitly—an export-base component. Some use relatively little regional data, although they contain a large number of national variables.

What conclusions can be drawn about regional and interregional econometric models? One stands out clearly. They are *economic* models, and most are simply small-scale versions of national models. The shift in emphasis from input-output to conventional econometric models has narrowed the gap—if, in fact, there ever was a noticeable one—between regional economics and regional science. As noted earlier, the focus of input-output models is on *structure* and interdependence. They also are independent of Neo-classical theory, and some of us in regional science believe that the Neo-classical model, which does not have a spatial dimension, is an inappropriate theoretical basis for regional analysis.[16]

The theoretical papers in the Adams-Glickman symposium referred to earlier have been criticized by Richard Muth, whose own work in regional econometrics is well-known. He states that these papers "contain very little by way of substantive hypotheses about the crucial factors affecting the distribution of economic activity among the various open parts of some larger economic systems. Implicitly, the principal hypothesis underlying

the various regional models seems to be the export-base theory . . . [and] this hypothesis is seriously incomplete since it pays little attention to relative prices and factor supplies."[17]

Muth's review supports my hunch that regional models are more consistent with the rubric "economics" than that of "regional science." He is also less than enamored by the usefulness of regional models. In his view "the fault lies not with the authors but with the economics profession as a whole . . . we have been all too ready to let econometrics substitute for careful thought. . . . Letting the data do our thinking is especially difficult in the areas of urban and regional economics, where those data are almost uniformly judged to be seriously deficient." He concludes that: "Our greatest shortcoming, probably, is our willingness to attempt what we are not yet prepared to accomplish simply because the end seems desirable and we have large-scale computers at our disposal."[18] I would argue that the weaknesses of regional models pointed out by Muth are exacerbated by undue reliance on outmoded economic theories.

IV

Conventional economics is in the doldrums. The Keynesian revolution has fizzled out. There has been a strong revival of Neoclassical, mechanistic doctrine including the misnamed "supply-side" economics. Economists, who like to think of themselves as being on the frontier of new knowledge, are amazingly unreceptive to new ideas. Or, perhaps, as Keynes put it: "The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds."[19]

The only major new ideas in economics since Keynes and Leontief are those advanced by Nicholas Georgescu-Roegen, developer of the bioeconomic paradigm. This is, I believe, a particularly apposite paradigm for regional scientists, although Georgescu-Roegen's ideas appear to be as little known among regional scientists as they are among conventional economists in the United States. Space considerations again preclude anything but the sketchiest outline of Georgescu-Roegen's system of thought.[20]

Keynesian theory, depite its allegedly revolutionary nature, was easily integated into the mainstream of conventional economics. Leontief's input-output model has not been absorbed into conventional economics because of its emphasis on *technical* relationships. But the demand-driven version, which is the one best-known in free-market economies, is entirely compatible with conventional economics.[21] Georgescu-Roegen's paradigm, however, cannot be reconciled with conventional economics. It is truly revolutionary since it makes a distinct break with the past.[22]

Conventional economists view the economic process in mechanistic terms. This is illustrated by the circular-flow diagram, found in the opening pages of most introductory economics textbooks, which depicts an economy in stationary—or more precisely, timeless and spaceless—equilibrium. Georgescu-Roegen, however, views the economic process as an extension of biological evolution. He rejects what he calls the "mechanistic

dogma." The economic process, Georgescu-Roegen points out, affects the economic system in a *cumulative* manner. The perpetual motion implied by the conventional circular-flow diagram is, of course, a logical absurdity. That is also true of the continuous growth solutions derived from the assumptions underlying conventional dynamic economic models.[23]

Georgescu-Roegen substitutes a life-cycle model of the economic process. Its rudiments can be described by the conventional production function of elementary economic theory, except in the bioeconomic model the vertical axis measures real output per person while the horizontal axis represents changes over time. A generalized version would include ranges of increasing, diminishing, and eventually *absolutely* diminishing returns.

Another essential element of Georgescu-Roegen's system—the one for which it is perhaps best-known—is the Second Law of Thermodynamics, or the Entropy Law. This law states that there is a continuous and *irreversible* transformation of energy from its free (or available) form into bound (or unavailable) energy. The entropic process is not limited to energy; it applies to all resources or to "matter" in its most general form.[24]

As stated earlier, Georgescu-Roegne's bioeconomic paradigm is a useful analytical framework for regional studies. Unlike conventional economic models, which deal only with growth, the bioeconomic model allows for growth and decline. And even in a growing national economy, some regions—or parts of regions—will decline while others are growing.

In an economy that is growing very slowly, or perhaps not at all, these opposing trends will be exacerbated. The rural to urban shift is one example of the coexistence of growth and decline. An even more complex spatial phenomenon is the long-term shift of population and economic activity from the Northeast and upper Midwest states to the South and the West. Surprisingly, although this phenomenon has been underway for some time, the literature dealing with interregional shifts—particularly in regional science journals—has been remarkably thin. It is not entirely clear why this is so, but I can suggest a couple of tentative hypotheses.

First, the resurgence of Neoclassical economics has not only influenced the economics profession, it appears to be spreading among regional scientists as well.[25] Harry Richardson, with his customary perspicacity, has developed an appropriate label for regional scientists who cling to the tenets of Neoclassical theory. He calls them "Neoclassical Moonies."

The Neoclassical explanation of shifts in population and economic activity from some regions to others is that this is simply the market at work. The "proof" typically cited is the long-term convergence of regional per capita incomes. That process will go on, according to Neoclassical theory, until interregional factor returns are equalized. Equilibrium will have been reached when, except for minor variations due to "random" causes, all regions will have approximately equal per capita incomes. At that point, presumably, there would be no inducement for factors of production, including human factors, to move from one region to another—again excluding "random" movements. The Neoclassical "solution" to interregional factor movements is elegant, but completely unconvincing. The space economy is far too complex to be analyzed realistically in terms of

the logically-satisfying, but grossly oversimplified, assumptions of Neoclassical theory.[26]

My second hypothesis is that it is difficult to separate economic analysis from policy analysis when considering interregional shifts in population and economic activity. And there has been a tendency among regional scientists, as there has been among conventional economists, to shy away from policy issues. Most of the regional scientists who have not been involved in the construction of econometric models have followed the lead of conventional economists who prefer to deal with abstractions rather than the mundane—although actually far more difficult—problems involving public policy.

It would be incorrect to leave the impression that there has been no interest at all among regional scientists and regional economists in interregional shifts in population and economic activity. Perhaps the journals of regional science are not the appropriate vehicle for discussion of the complex issues involved. There have been, however, three conferences that I know of which were organized to discuss these shifts, and they dealt with them both analytically and from a policy perspective. The first, held in December, 1975, was sponsored by the New York State Senate.[27] The second was held at the University of Texas at Austin, in the Fall of 1977.[28] The most recent was organized by Harry Richardson at the State University of New York at Albany, in April 1982.

How useful are such conferences or, perhaps more precisely, the publications that result from them? In an acidulous review of the papers prepared for the University of Texas symposium, Vining concluded that "the subject of regional change in the U.S. is about 'conferenced out'," if I may quote his own ungraceful neologism. This is not because he believes the issues have been settled, but because he sees the papers presented at the Texas symposium as "essentially, a series of data file dumps . . . valuable to have been between hard covers . . . but indigestible even after several sittings."[29]

Whether academic conferences, symposia, or other means of exchanging information and ideas are appropriate avenues for exploring the problems resulting from regional shifts in economic activity is an issue that could be debated endlessly. But the problems are real. Furthermore, the nature of regional problems in the United States has changed rather dramatically within the past two decades, and it would be premature to conclue that there is no further need for discussion of these problems and the entire range of regional policies that are involved.

The nation's regional problems are not purely economic. They are multidimensional. I can think of no issue that is more consistent with the original concept of regional science than that of regional change in the United States. To view regional change entirely as an economic problem is to ignore important social, psychological, and political issues. To believe, with devout Neoclassical Moonies, that the market will take care of all of these problems, is to wish them away. It would also, in my view, negate the foundations of regional science.

If regional science is not going to evolve beyond the narrow confines of conventional economics, why bother with a different name? I have a hunch—although it is nothing more—that after a period of seeking a new identity, regional science has been regressing toward regional economics. If it is to fulfill the promise of its founders and early practitioners, however, regional scientists will have to break out of the constraints and methodological limits imposed by a predominantly economic focus, particularly if that focus is further narrowed by reliance on the spaceless assumptions of Neoclassical theory.

FOOTNOTES

1. New York: MIT Press and John Wiley & Sons, 1956, pp. 24-54.
2. Some of the highlights are given in my earlier paper, "The Realism and Relevance of Regional Science," *The Review of Regional Studies*, Vol. 6, No. 1 (Spring, 1977), pp. 1-10. A more detailed account is given in Isard's response to the award of the Founder's Medal on November 11, 1978. See "Notes on the Origins, Development, and Future of Regional Science," *Papers of the Regional Science Association*, Vol. 43 (1979), pp. 9-22.
3. See, for example, E. M. Hoover, *Location Theory and the Shoe and Leather Industries*, Cambridge, MA: Harvard University Press, 1937; W. H. Dean, *The Theory of the Geographic Location of Economic Activities*, doctoral dissertation, Harvard University, 1938; selections published by Edward Brothers, Inc., Ann Arbor, MI, 1938; Morris E. Garnsey, *America's New Frontier*, New York: Alfred A. Knopf, 1950.
4. A number of authors are identified by their affiliation with urban and regional research centers or institutes, rather than by discipline, but several of their papers also deal with strictly economic issues.
5. Cf. Isard, "Notes on the Origins, Development, and Future of Regional Science," *op. cit.*, p. 10.
6. I use the term "conventional economists" to cover the Keynesian, Neo-Keynesian, Neoclassical, and Marxist schools.
7. It is surprising that there has been less interest—particularly in recent years— in the Clark-Fisher type of structural analysis, although Perloff and his associates used it extensively in their monumental *Regions, Resources, and Economic Growth*, Baltimore, MD: Johns Hopkins University Press, 1960. I have found this framework to be particularly useful in the analysis of long-term regional growth and decline, especially when those trends are influenced by differences in resource endqwments and differential changes in regional energy supplies and prices.
8. Englewood Cliffs, HJ: Prentice-Hall, 1975.
9. At least three conferences have been held during the past five years to discuss the state of the art of regional modeling. The proceedings of two have been published; the third has yet to appear in print. See Saul Pleeter (ed.), *Economic Impact Analysis: Methodology and Applications*, Boston, MA: Martinus Nijoff, 1980, and a review by Geoffrey J. D. Hewlings in the *Journal of Regional Science*, Vol. 22 (May, 1982), pp. 255-256. See also *Modeling the Multiregional Economic System: Perspectives for the Eighties*, Gerard Adams and Norman J. Glickman (eds.), Lexington, MA: Heath Lexington Books, 1980, and a review by Richard F. Muth in the *Journal of Economic Literature*, Vol. 20 (March, 1982), pp. 144-145.
10. See W. L. L'Esperance, *The Structure and Control of a State Economy*, London, Pion Limited, 1981.
11. W. H. Miernyk, *Regional Analysis and Regional Policy*, Cambridge, MA: Oelgeschlager, Gunn & Hain, Inc., 1982, pp. 1-36.
12. For a summary, see W. H. Miernyk, "An Interindustry Forecasting Model with Water Quantity and Quality Constraints," *Proceedings, Fourth Symposium on Water Resources Research*, Columbus, OH: The Ohio State University Water Resources Center, 1970, pp. 49-58.
13. An excellent summary of the development of this model is given in Karen Polenske, *The U. S. Multiregional Input-Output Accounts and Model*, Lexington, MA: Heath-Lexington Books, 1980.
14. See Charles M. Tiebout, "Regional and Interregional Input-Output Models: An Appraisal," *The Southern Economic Journal*, Vol. 20 (November, 1957), pp. 140-147.
15. W. H. Miernyk, "Regional and Interregional Input-Output Models: A Reappraisal," in *Spatial, Regional, and Population Economics*, Perlman, Leven, and Chinitz (eds.), New York: Gordon and Breach, Science Publishers, Ltd., 1973, pp. 263-292.
16. For further discussion of this important point, see Harry W. Richardson, *Regional Growth Theory*, London: Macmillan, 1973, especially pp. 22-29, and 105-106.
17. *Op. cit.*, p. 144.
18. *Ibid.*, pp. 144-145.
19. J. M. Keynes, *The General Theory of Employment, Interest, and Money*, New York: Harcourt, Brace, and Company, 1935, p. viii.
20. For further details, and my attempt to link the bioeconomic paradigm to regional problems, see *Regional Analysis and Regional Policy*, *op. cit.*, pp. 69-73, and 95-105.
21. Since the input-output model is "value-free," it is also compatible with models in which demand is not an exogenous variable. See W. H. Miernyk, *The Elements of Input-Output Analysis*, New York: Random House, 1965, pp. 88-89.
22. As the previous footnote suggests, however, there is no incompatibility between Georgescu-Roegen's views of the economic process and input-output analysis.

23. On this, see Albert A. Bartlett, "Forgotten Fundamentals of the Energy Crisis," *American Journal of Physics*, Vol. 46 (September, 1978), pp. 876-888.
24. Perhaps the best brief explication of bioeconomics is to be found in Nicholas Georgescu-Roegen, "Energy and Economic Myths," *The Southern Economic Journal*, Vol. 41 (January, 1975), pp. 347-381. The views in this article are elaborated and extended in "Energy Analysis and Economic Valuation," *The Southern Economic Journal*, Vol. 45 (April, 1979), pp. 1023-1058. The most complete statement is found in Georgescu-Roegen's classic *The Entropy Law and the Economic Process*, Cambridge, MA: Harvard University Press, 1971.
25. This is so in spite of the fact, pointed out years ago by Lösch, that there is a basic incompatibility between the assumptions of perfect competition, which underlie Neoclassical models, and the explicit introduction of space in the analysis of economic problems.
26. My views about the long-run consequences of interregional shifts—which do not include a spatial "equilibrium"—are discussed in *Regional Analysis and Regional Policy, op. cit.*, pp. 101-106.
27. See *Balanced Growth for the Northeast*, Albany, NY: New York State Senate, 1975.
28. See Victor L. Arnold (ed.), *Alternatives to Confrontation: A National Policy Toward Regional Change*, Lexington, MA: Heath-Lexington Books, 1980.
29. *Journal of Regional Science, op. cit.*, pp. 261.