

Chapter 3

Is Regional Science Just Economics with a “ d_{ij} ” Added to All Equations? Some Thoughts of an Economist



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Abstract This chapter looks at the extent to which “regional science” is distinctive enough to be called a unique sub-discipline. It considers the background against which the idea of a regional science was initiated and at the publications, institutions, and work that has been associated with the idea. In particular, it reviews the ways the American Economic Association has sought over the years to embrace geographical spatial analysis with the larger body of economic thinking. But this still leaves open the question of whether location and distance are really that different to the numerous elements included in modern economic analysis. The chapter looks at whether, even if there were a justification for a regional science in the 1950s, this has evaporated as economic thinking and analysis has morphed into something more integrated with other areas of social analysis. The conclusions reached are that even at the outset the notion of a specific regional science was vague and added little to what regional and urban economists were discussing. And even if differences could have been detected 75 years ago, these have now evaporated.

Keywords Regional science · Regional economics · Spatial analysis · Replication · Meta-analysis

3.1 Introduction

Having duly recognized the significant inputs of non-economists to regional science, I am nonetheless convinced that the scientific respectability of regional science depends largely on its degree of respectability within mainstream academic economics. (Hanson 1995)

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Regional economics as a sub-discipline of economics really does not exist any longer... The vitality of regional science, too, is threatened by the absence of intellectual challenges from economists and by the diminished role that economists seem to play in shaping the core ideas of regional science. Both regional science and economics are the poorer from this development. (Giarratani 1995)

Some years ago, in my middle age, I found myself on a list of the “Intellectual leaders of regional science.” Actually, I was number 80 out of the 94 listed individuals with 14 citations or more between 1990 and 2001 in designated regional science journals (Isserman 2004). But then again, this was in an era prior to the death by drowning in publications that now dominates academia, and the baseline of 14 was I thought quite an achievement. But what really puzzled me is that I found this an odd position to find myself. Until then I had never considered myself a regional scientist. I had a pretty good idea what some people thought regional science was, after all I had been in Kingsley Haynes’ Institute of Institute of Public Policy at George Mason University for quite a few years and that had a serious interest in spatial activities. But I did ponder over exactly what regional science was, and I asked myself why a transportation, and part-time regional, economist was suddenly being reclassified.

I proceeded to do some digging into the history of regional science, and what exactly it is, or at least what it thinks it is. I was particularly stimulated by the quote of Niles Hansen at the head of this paper. Hansen was at the time an Emeritus Professor of Economics at a major university, the University of Texas, and a significant figure in regional economics. In the original article from which the quote is extracted, Hansen was reflecting on the possible future of regional science within the longer-term historical development of the subject. In particular, if regional science was at all important why did it need approbation from economists? John Meyer’s (1963) seminal survey also raises definitional and credibility issues, but from the opposite perspective, “Almost from the beginning, the convention, at least in formal discourse, has been to speak of ‘regional analysis’ and ‘regional science’ rather than ‘regional economics’.”

This chapter looks at the extent to which this segmentation of courses, journals, and academic departments has added much to the study of, in this case, what has become known as “regional science.” In other words, does the concept of regional science really add that much to conventional economic analysis? And perhaps, as flowing from Frank Giarratani quote at the beginning, “are there sorts of synergies or marketing advantages in somehow bringing the two titles together?”

There is certainly a literature that calls itself “regional science,” and much of it appears in journals bearing the name, e.g., *Annals of Regional Science*, *Papers of the Regional Science Association*, *Regional Science and Urban Economics*, and *Regional Science Policy and Practice* (Boyce 2004). There are also numerous very active associations around the globe that carry the title of “regional science” and conferences and workshops associated with them. But, the issue raised is “Does this really extend our analysis of spatial activities very much beyond what economists now cover or, indeed, have historically covered?”

I successively, after briefly exploring the general patterns of specializations in economics and the factors that have been driving them, move to look at the trends regarding the ways that distance and location are treated. I ask whether there is any substantial intellectual difference with the ways that variables other than space and spatial institutions are considered in economics and, indeed, whether there should be any difference. It takes some of the ideas that have appeared under the general heading of regional science and considers whether the underlying theories, methodologies, and estimation procedures differ significantly, or at all, from those associated with what one may call mainstream economics. Put bluntly, “Is regional science just a marketing tool for selling a particular topic of analysis, not to say conferences, associations, journals and courses, rather than a genuine separate science?” Finally, it looks at whether some of the recently debated problems in applied economics, including regional economics, are also applicable to the work in regional science.

A specific factor affecting my choice of subject matter is two sets of papers, one published in 1995 in the July issue of *International Regional Science Review* and the other in the January 2005 issue of *Papers in Regional Science*. Both of these offer a range of views about the then state of regional science.¹ Both were also timely, not just because of the subject matters covered – they focused on the first 40 and first 50 years of regional science, respectively – but because they included reflections from some of the more “senior academics” in the field who had been active during what some saw at the time as the heyday of the subject. The mid-1950s was the period regional science was said to have broken away from economics into what was seen as a multidisciplinary area of study. Many things emerged from these edifying collections, not least of which was the ebb and flow of interest in regional matters, and how this had impacted on the education and research that was being conducted. I update this work to some extent.

3.2 Why Separate Out Areas of Study?

Academics have always loved to classify things, and classifying academic fields of study has been at the forefront of their endeavors. Over the years there has been a gradual fine-tuning in the way that we define what may loosely be called “academic disciplines.” Disciplines have always been a somewhat difficult thing to specify with any degree of precision. The challenge has increased as the extent of global knowledge has grown, and the human brain has fallen behind in its capacity to handle it all. It became more pronounced after it reached the point when it was impossible for any individual to have universal knowledge.

¹Other notable retrospective collections are the July 2007 issue of *Regional Science and Urban Economics* that reflects on 35 years of the journal and the April 2012 special issues of the *Journal of Regional Science* that assess the then state of spatial econometrics.

The possibility of “Renaissance man” quite literally ended after the Renaissance. This is when “knowledge” began to be divided up. Instead of Leonardo da Vinci splashing a little paint on a panel of wood prior to breakfast to produce the Mona Lisa, drawing a few lines after eating to plan out Milan’s canal system, and, following lunch, proceeding to invent the helicopter and to think over the mechanics of an adding machine and, just before going to bed, dissecting a human cadaver at the Hospital of Santa Maria Nuova, modern academics tend to mull for days or weeks over the appropriate number of places of decimal for parameters in a constrained gravity model. Such a degree of specialization requires an appropriate descriptive discipline for respectability.

This pattern has manifested itself in most areas of study. As can be seen from the ever-expanding listings of economic subdivisions in the *Journal of Economic Literature (JEL)*, economics has been gradually fragmenting over time after it ceased to exist as one area of moral philosophy.² In some cases, this has involved a simply dividing up of a *JEL* classification, but in others there has been a clear narrowing down as some areas of study have been seen to have shifted away from economics. So how does economics in general treat regional analysis in this world of increasing specialization? Are the complaints justified that it was being given short-shift by economists, and thus a new regional science was needed? One way of looking at this is to consider how one of the major economics bodies has treated regional analysis.

The first number of the *American Economic Review (AER)* published in March 1911 listed ten categories or sub-interests of economics, of which “History and Geography” was the second item (Cherrier 2017). The list was subsequently modified over the years in a largely ad hoc way until the demands of both the Social Science Research Council and the American Council of Learned Societies found it necessary to have a more complete categorization for World War II planning purposes. Registers of individual economists’ expertise were compiled and then maintained after the war. Efforts to have a National Science Foundation social science division failed mainly because of issues over the political neutrality of the research involved, and, in any case, there were questions over its usefulness. Largely for practical purposes of helping editors select referees for the *AER*, the American Economic Association (AEA) was in parallel seeking an updated classification system. A genus-species 17 categorization draft list drawn up in 1940 by AEA Secretary James Bell had no mention of regional economics (although economic geography was seen as a subcategory of industrial history). Paul Homan, subsequently editor of the *AER* from 1941 to 1951, came up with a problem-oriented list of 23 categories also in 1940 that included “4. Economic Geography and Regional Economics.”

²I focus mainly here on the situation in the USA. There were similar debates taking place elsewhere and especially in the UK from the mid-1980s when the Government’s Research Assessment Exercise was introduced across all disciplines to assist in the award of university grants. A defined subject specialism of an academic department, as well as the quality of the faculty, affected allocations of resources.

The AEA’s 17 classification subsequently adopted in 1949 was largely based on criteria to help categorize personnel in the context of job markets and articles for refereeing. Although not mentioning regional economics, the list did explicitly have “**15. Land Economics; Agricultural Economics; Economic Geography.**” An updating in 1956 saw “Housing” added to the category.

Perhaps more germane, “(c) Area Studies (regional and national economics)” was explicitly added to “**3. Economic History; Economic Development; National Economic**”.³ This remained the situation for a decade when further changes to the AEA classification saw a stronger recognition of spatial economics with the introduction of “**900. Welfare Programs; Consumer Economics; Urban and Regional Economics.**” Urban economics, a major growth area of interest in the late 1950s and 1960s, despite considerable pressure, was not given a separate categorization, and regional economics was assumed to embrace economic geography (Cherrier 2017).

The increasing output of economics papers, including those covering regional and urban topics, combined with the needs for the US National Science Foundation for clear classification of subject matter as more social science awards were made, led to considerable adjustments to the AEA classifications for the late 1960s. Most notable was the introduction of intermediate categories within a maximum of ten classifications. The listing was also transferred to the *JEL* in 1970, with an ongoing series of minor revisions into the mid-1980s. More detail was added to classifications. That really did little, however, to change the degree of emphasis given to regional economics. In 1991 the number of classifications rose to 19 (**R** being Urban, Rural, and Regional Economics)⁴.

Perhaps even more pertinent to my discussion is the current *JEL* classification “**R – Urban, Rural, Regional, Real Estate, and Transportation Economics.**” And within this are subdivisions for “**R1 – General Regional Economics**” embracing such as the following:

- Regional economic activity (growth; development, environmental issues, and changes; size and spatial distributions of regional economic activity; general equilibrium and welfare economic analysis of regional economies; land use patterns; and econometric and input-output models)
- Household analysis (housing demand; regional migration, regional labor markets, population, and neighborhood characteristics; and government policy)
- Real estate markets, spatial production analysis, and firm location (housing supply and markets, other spatial production and pricing analysis, nonagricultural and nonresidential real estate markets, and government policy)
- Regional government analysis (finance in urban and rural economies; land use and other regulations; public facility location analysis, public investment, and capital stock; and regional development planning and policy)

³There was a considerable argument over the positioning of economic geography. Fritz Machlup, the international economist, along with some others, felt it should be split between “Area Studies” and “International Economics” on the basis that it entailed comparative analysis.

⁴Edwin Mills, an innovator in the new urban economics, provided blueprints for the organization of “Urban, Rural, and Regional Economics” classification, and Richard Muth, another with an interest in NUE, was consulted on urban economics.

And this does not include the listings under Transportation, a subject which many see as important in analysis of spatial behavior following the development of the new regional economics associated with the likes of Paul Krugman and Anthony Venables.

The history tells us several things. First, John Meyer is a little offtrack in saying that the subject under discussion here has almost always been known as “regional science.” While terminology, for a diverse set of reasons, often adjusts and is modified, the term regional economics has a pretty well-established pedigree, at least within the academic economic field. Second, very eminent people have been concerned to have regional economics and related matter included in categorizations of economics as defined by the main US academic body. Some, such as Walter Isard as we see below, may have argued for more, and others less, but given the wide coverage of economics, it is difficult to say regional economics (and, by default in Meyer’s argument, regional science) has somehow been neglected.

Given this, where is the gap regional science now seeks to fit into?

3.3 Historical Context

Delving further into definitions, at the outset it is clear that it was difficult to precisely define economics let alone elements within it. Indeed, Jacob Viner’s supposed definition that “Economics is what economists do” (Spiegel 1987) and Kenneth Galbraith’s view that “Economics is extremely useful as a form of employment for economists” probably sum up the situation as many still see it, but it can be defined with more precision.

Economics as we know it today has a much shorter history than many people think although the term economics goes back to the classical Greek word “*Okonoma*” meaning “household management.” This was the way, for example, the philosopher Aristotle used it. As time changed, the concept was broadened out considerably. By the eighteenth century, many elements of what we now think of as economics came within “moral philosophy.” This is a branch of philosophy that contemplates what is right and wrong and examines how people should live their lives in relation to others. Adam Smith (1776), although fundamentally a moral philosopher as seen in his “other book,” *The Theory of Moral Sentiments*, changed this. He argued that economics is a science that enquires into the nature and causes of the wealth of nations.

Alfred Marshall, who formalized the prevailing knowledge of the day, argued from the late 1890s that “Economics is the study of humans, in relation to the ordinary business of life. It studies that portion of the personal and social activities, which are closely related to the attainment of material resources, related to welfare and its utilization.”⁵ With this, Marshall offers perhaps the most cited definition of

⁵In his *Principles of Economics*, Marshall (1890) does include a specific chapter on “The concentration of specialized industries in particular localities” as well as introducing space and geography into a variety of economic discussions.

the discipline, but why does a subdivision such as regional economics (or regional science) need a particular delineation? In fact, most would argue that it is more of a topic than a social science sub-discipline. While it is difficult to be precise about what regional economics covers, this seems true of most sub-areas of economics and indeed of other disciplines. Most are defined by lists of interests or topics. Additionally, the pedigree of regional economics, as with economics in general, is clearly one of an applied study area rather than one that has grown from abstract theory. The distinction between regional economics and regional science, as seen below, is, therefore, difficult to make unless the topics covered vary significantly.

It was a practical matter that led to the move to establish institutional structures fostering the study of regional science. This came from a feeling that economics in the 1950s was missing an important spatial dimension and thus was not a complete social science.⁶ As David Boyce (2004) explains, the catalyst for action by Isard and others was the perceived lack of attention the AEA was paying to locational analysis and regional problems despite the discussions of classifications outlined above.⁷ In that sense, regional science may be seen as coming about largely by default as opposed to any major positive shift in academic thinking. Much of this perceived preoccupation of economists of the day was seen by Isard and others as refining Keynesian macroeconomics theory and in testing it by applying increasing computer power to the new national income accounting.⁸ The more established microeconomists were seen as engrossed in considering the implications of the inter-war work of the likes of Edward Chamberlin, Joan Robinson, Harold Hotelling, Hall and Hitch, and others on understanding the complexities of industrial organization.⁹ But countering this, as we have seen, it was also about this time that “Area Studies” was introduced into the AEA classification system, suggesting spatial economics was not being quite as strongly pushed to one side as was perhaps being claimed.

But even after the Regional Science Association (RSA) was formed in 1954 in response to a supposed neglect of spatial aspects of economics, its objectives were unclear. This was not perhaps surprising for a such a diverse group comprised largely of academics drawn from economics, geography, city planning, political science, and rural sociology. In the first issue of its *Papers and Proceedings*, the Association

⁶It was also about this time, in 1946, when, for similar reasons, the Transportation and Public Utilities Group was formed as the first associated organization to the AEA by economists such as James Nelson, Charles Dearing, and Ralph Dewey who were interested in those subjects.

⁷Isard (2003) provides a more detailed account, while Barnes (2003) offers a critical assessment. It should perhaps be noted that Isard himself seemed to publish in economics journal in the early 1950s, e.g., Isard (1951).

⁸One might also argue that the early 1950s was also the time that the embryonic ideas of regional multipliers, regional input-output analysis, regional trade-theory, etc. were laid down, albeit initially in the context of “national regions” rather than “economic regions.”

⁹In fact, the inter-war theoretical literature had already said quite a bit on the effect of space on industrial organization – e.g., Hotelling (1929) on oligopolies and Chamberlain (1933) on monopolistic competition.

stated its objectives as being “. . .to foster exchange of ideas, and to promote studies focusing on the region and utilizing tools, methods, and theoretical frameworks specifically designed for regional analysis as well as concepts, procedures, and analytical techniques of the various social and other sciences.” Isserman (1995) suggests this may be taken as meaning applying economic approaches and methodology to geographical problems. Later, Harvey Perloff (1957) did little to clarify this very broad definition when he stated “Regional studies (*sic*) tend to deal with many features and often involve the use of several academic disciplines. Thus, no general system of classification can be expected to provide self-contained categories; there is inevitable spill-over.” He goes on to essentially list topics he considers covered by regional studies. Walter Isard (1960) similarly resorts to a compendium of what amount to economic problems. As Meyer (1963) puts it, “A distinctive aspect of Isard’s definition is its exclusive emphasis on what economists would normally construe or recognize as economic problems.”¹⁰

Further, Meyer, trying to setting this in the context of regional economics, finds Isard’s list to be too long and suggests cutting it to “. . .(1) problems of regional analysis with unique conceptual characteristics, and (2) specific areas of particularly heavy interchange between conventional economic theory and regional economics.” But even in doing this, Meyer also finds little to distinguish regional analysis from economics more generally, viz., “While regional definition problems do possess several reasonably unique elements not encountered in conventional economic analyses, they hardly would appear substantial enough to give regional economics a thoroughly distinct identity.”

In a slightly later contribution from the other side of the Atlantic, Arthur Brown (1969) in a major survey paper also had problems in defining regional economics, let alone regional science. He looked at the situation from a more applied, policy-oriented perspective. He ends up with:

Regional economics is a field of study which has meant different things to different people. To some it has meant primarily the study of the economy and the economic problems of a particular region – generally one that is part of a wider area within which free trade prevails, and within which movement of labour and capital are not subject to control. To others it has meant the wider study of the relative economic performances and economic interactions of a number of such regions.

Added to this is the idea, beginning in the early 1960s, that regional and urban studies could also be set on a more political science-based foundation. This movement includes the establishment of the Regional Studies Association that, through its journal *Regional Studies*, seeks to facilitate discussions involving economic development and growth and conceptions of territory and its governance and of equity and injustice. Interestingly, the Regional Studies Association did not link with the RSA

¹⁰Meyer also footnotes that Isard’s book “constitutes a good single-volume introduction to regional economics. . . .”

because it felt the latter was too US oriented and could not embrace the peculiarities of the British and wider European situations.¹¹ The Southern Regional Science Association also had morphed somewhat in this direction with its publication of *The Review of Regional Studies*. There has also been some spatial, rather than geographical, specialization with the emergence in 1964 of *Urban Studies* with a similar multidisciplinary ethos.

By the mid-1970s, there had been a slight shift in thinking, at least as portrayed by Harry Richardson (1978b) in his survey of the “State of Regional Economics.” He takes a rather pragmatic position. He felt that there was a plethora of new regional problems that had just emerged offering more work for regional economists as theorists, technicians, and policy analysts. These trends, which are reflected in the current AEA classification of regional economics outlined earlier, included the role of environmental quality in regional development, the regional impacts of rising energy costs, the increasing importance of amenities as locational attractors, the decline of large cities and the growth of exurban hinterlands, and the influence of emerging communication technologies. While some of the resultant issues could be handled within the boundaries of traditional disciplines, he argues others would probably require an understanding of the process of managerial decision-making and of psychology. In the latter cases, “only the new disciple of regional science offers...freedom from the stifling influence of the great but limited neoclassical tradition.”

3.4 Defining Regions

But all of this activity really begs the questions, “What is a region?” Meyer (1963) offers three possibilities, basically self-contained or nodal regions, homogeneous regions, and administrative regions.

An economist may well argue that the last of these, administrative regions, have characteristics very similar to nation-states and indeed some national states are much smaller than so-called regions within a large country – Singapore, for example, is smaller than the mid-west region of the USA by many orders of magnitude.¹² It is difficult to see in this case where the standard tools of international economics and macroeconomics are deficient for analyzing the associated regional questions. Administrative regions are, after all, largely institutional rather than

¹¹This complaint is more difficult to make now since the founding of numerous national and sub-national Regional Science Associations and of the Regional Science Association International.

¹²Kristian Behrens and Jacques Thisse (2007) make the salient point “... regardless of what is meant by a region, the concept is useful if and only if a region is part of a broader network through which various types of interactions occur. Without taking this aspect into account, one may wonder what the difference between regional economics and the macroeconomics of a closed economy would be.”

nature's constructions, and economists have a long tradition of analyzing matters of economic interest both within and between countries. Indeed, given the growth of common markets of various forms, there are mega-global regional structures that act very much like a single country, with countries within them being conceptually the same as metropolitan areas and the like within a nation-state. Economists contribute extensively to the analysis of these.

The tools used for looking at international trade and production flows between countries and those used to look at trade and flows between politically designated regions within a country are, in fact, technically identical. The point Machlup made nearly 50 years ago in the AEA classification debate. The gravity model used by John Stewart and William Warntz (1958) on regional migration differs little from the almost contemporaneous study of global trade flows conducted by Jan Tinbergen (1962). Equally, when considering economic activities within regions, the use of fiscal multipliers, input-output analysis (Richardson 1978a, b), and computable general equilibrium models (Giesecke and Madden 2013) is essentially no different to their macroeconomic counterparts. For estimation purposes econometrics, which had in the immediate World War II period focused mainly on time series estimation of macroeconomies, began to consider cross-sectional challenges such as handling issues of spatial autocorrelation. This was partly stimulated by macroeconomic considerations of structural industrial change and demographics, as well as the fact that relative spatial location and agglomeration economies are important in this.¹³

Where differences may be seen to exist is in the practical challenges associated with availability of data.¹⁴ The notions of homogeneous regions and nodal regions have many attractions from a theoretical and economic modeling perspective. Homogeneous regions provide a basis for interregional trade analysis and discussions of comparative advantage and agglomeration effects, while the concept of nodal regions offers the basis for thinking about balanced growth and local externalities. The testing of hypotheses, however, has long been a challenge in both cases because of the lack of adequate and reliable data at any sub-national level of analysis. Regional accounts, where they have existed, have normally been at the administrative region level (Brown and Woodward, 1969). Given the growth in urbanization, continually shifting administrative boundaries, and changing demographic and industrial trends, such data are often far from reliable, especially if the interest is in the dynamics of regional development. But all this applies to international economics.¹⁵ One can use Paul Samuelson's (1954) analytical iceberg model of trade, for example, at any level of aggregation with minimal tweaking, but operationalizing it is not so easy. The problem is not unique to regional analysis.

¹³Jean Paelinck seems to have originated the term "spatial econometrics" in 1974. Moran's (1948) work is generally considered the origin of spatial autocorrelation analysis.

¹⁴If Isard did have a case for highlighting regional economic issues in the 1950s, it was on the grounds of inadequate official data collection rather than any intellectual neglect by the AEA. Richard Stone (1961) offers observations on the UK data situation in the 1950s.

¹⁵This is one reason why local case studies have been a pronounced feature of regional studies where, unlike regional science, overriding laws are not sought.

3.5 A “Science” or What?

This leads to another issue: Is regional science a “science,” or, specifically in this case, a “social science,” or a set of ad hoc observations and topics? Adam Smith maintained that “Science is the great antidote to the poison of enthusiasm and superstition.” But it is not easy to conduct scientific experiments of the type Smith seemed to envisage with the data available. As a consequence, the argument over whether or not economics is a science or not is ongoing. But clearly with the formation of the RSA, there were those who did think that regions could be studied scientifically and systematically or else they would have adopted another title (Isard 1956).¹⁶

Many these days feel this view was a little optimistic. Trevor Barnes (2003), for example, argues that “. . . regional science would have fared better if rather than emphasizing science, it emphasized the region.” Isserman (1995) also probably sums up many people’s view these days that “Regional science never became a science or a discipline, and it has had a peculiar relationship to regions. Yet, the concept has had spectacular success as a basis of many international, interdisciplinary scholarly forums, and it has produced noteworthy contributions to several disciplines.” The technical reasons why regional science falls short of being a “science” are returned to later. Here I offer some comments on what regional science has achieved and some observations on why trying too hard to be some sort of hard science has often been counterproductive.

As already discussed, even the definition of a region is problematic and certainly falls far short of anything like the natural elements isolated in physicals. Instead it is largely about problems and topics; location, migration, spatial concentration, etc. And this is really the point Isserman is making. These are only affected in a relatively small way by common scientific laws. They are also influenced by public policies and human reactions, including reactions to the findings of regional “scientists” and indeed regional economists. Atoms do not react to the analysis of physicists, but regions can react to policy shifts stimulated by work of regional analysts. In that sense, much of what appears as positive regional science is effectively a normative activity designed to influence human welfare as well as describing it.¹⁷ It is akin to the old idea of moral philosophy. The uptake of the findings of regional analysis is in effect endogenous to the way that people behave over space; the information from analysis affects the outcome.

There is also another issue worthy of attention. Science usually involves measurement and with this comes the need for some form of metric. Some metrics are common across subject areas, others more specific. Economists, while talking about utility, generally use a money metrics as a proxy to value. With all its domestic challenges of needing adjustments for inflation in time series applications, and for

¹⁶In fact, Isard had wanted to call it “spatial science” but felt this would confuse it with physics and astronomy.

¹⁷Here we talk about social science in the way Lionel Robins (1932) does.

international exchange rate movements in some cross-sectional work, it is a fairly standard gauge.¹⁸ In terms of regional analysis, distance (d_{ij}) becomes the obvious measure of impedance, and benefits can be gained by reducing journey lengths. The problem is that given diversity of terrain and climate, d_{ij} is not a good metric and indeed may in a sense well be endogenous when it comes to location and similar decisions. The result is that much of regional science resorts to the use of money as a key input into its forecasting and evaluation exercises just as economists do. It allows comparisons cross a diverse range of inputs and outputs and across both consumers and producers.¹⁹ But its imperfections also partly explain why any area of economics, just as so-called regional science, is not a natural science and thus objective quantification is a particular issue. Both, by definition, inevitably make use of multidisciplinary approaches or at least approaches that are increasingly less rigid in their underlying assumptions.²⁰

3.6 The “New Regional Economics” and “New Urban Economics”

The world does not stand still, and over the past 40 to 50 years, there have been changes in the way that regions have been analyzed and indeed why. The elder of the two papers that stimulated this chapter appeared a quarter of a century ago, and there have been subsequent changes in the tools available for looking at regions, partly due to advances in theory, partly through better analytical tools, and partly because of improved data. The prefix “new” has been attached to both regional and urban economics and to human geography to draw boundaries in thinking (Hansen 1995). The question thus concerns the extent to which regional science as seen, albeit rather opaquely, has moved on since the mid-1950s.

The new urban economics (NUE), initiated by the works of Mills, Muth, and Martin Beckmann and their likes, moved the study of cities from what was largely a set of descriptive exercises focusing on urban sectorial problems – congestion, housing, deprivations, etc. – that were largely aimed at helping urban planners to

¹⁸Some transportation economists have in the past discussed the idea of using time (hours or minutes) as a measure of value on the basis that it is more equitable. It never gained acceptance.

¹⁹There are programming techniques, such as data envelopment analysis, that are not limited to a single unit of measurement and that have a fairly long pedigree in economics, although admittedly not often used in spatial analysis. John Hicks (1960) provides an early general survey of some of these.

²⁰John Maynard Keynes gives a more complete reason, “I also want to emphasise strongly the point about economics being a moral science. I mentioned before that it deals with introspection and with values. I might have added that it deals with motives, expectations, psychological uncertainties. One has to be constantly on guard against treating the material as constant and homogeneous in the same way that the material of the other sciences, in spite of its complexity, is constant and homogeneous” (Letter to Roy Harrod, 10th July 1938).

studies that are based on abstract modeling and empirical testing. The underlying NUE idea had been around since the mid-1970s – Richardson (1977) and Mills and MacKinnon (1973) provide overviews of the early works – and the result was the focus very much shifting to the dynamics of cities. This is perhaps not surprising considering the rapidly changing nature of urban form, industrial structures, and lifestyles that were taking place at the time. Intellectually, the subfield began to integrate welfare economics and urban economics within a general equilibrium framework.

What the approach has lacked, however, has been an inability to satisfactorily tie in urban change with other societal and economic shifts in the likes of information technology, migration, and the service economy. Much effort has gone into seeking to optimize city sizes or distributions without allowing for interactions between spatial attributes and other determining factors such as shifting production functions and consumer preferences (Button 2000).

The arrival of the new regional economics and geography stemmed from the adoption of Krugman’s (1991) and Masahisa Fujita and Krugman’s (2003) argument that perfectly competitive, partial equilibrium models of spatial interaction are not useful. The new regional economics focuses primarily on the forces that lead to agglomeration of activities at a variety of spatial levels, including the international. It relies on high-technology numerical examples that the availability of enhanced computing power and big datasets allows (Fujita et al. 1991). In a way this approach has forced analysis much more toward an empiricism that Isard (1956) had advocated 35 years previously for regional science.

Articles making use of these two “new” approaches are to be found in both the regional science and regional economics literature. One problem with these approaches, however, is that while greater quantification is welcome, there are many qualitative factors that affect, for example, decisions to relocate production, to migrate, to invest in public infrastructure, etc. As Albert Einstein put, “Not everything that counts can be counted, and not everything that can be counted counts.”²¹ Even with the greater appreciation of this across many areas of economics, especially with the growth of interest in the role of institutions and in behavioral economics, there has been something of a lag in the sophistication of their incorporation in regional economics. If they are included, they often come in the form of descriptive, fixed effects rather than as strict causal variables.²²

A further criticism, and one that is increasingly less valid, is implicit in the previous doubt cast over the way spatial econometrics is deployed to examine various hypotheses, essentially the challenge one of moving from theory to quantification. Stephen Gibbons and Henry Overman (2012), however, argue, with

²¹This is very much in line with Mario Polèse’s (1995) argument that the fact regions are very distinctive makes generalization along traditional scientific lines extraordinarily difficult. In a nutshell, one should focus on individual regions.

²²In particular, the new institutional economics associated with the likes of Oliver Williamson (2000) have provided positive theories allowing a richer range of economic hypothesis to be explored.

considerable justification, that such concerns are often “. . .based on imprecise and ill-informed perceptions of the sophistication and diversity of the work of the spatial econometrics and wider academic community.” They go on to provide illustrations of cases where, unlike the traditional strawmen analysis that is it mechanical and its results accepted purely based on the statistical significance of variables, involve careful econometric analyses. The cases reflect situations where the work considers a priori rationalizations and in which economic theory is at the core of their specifications. But there still remains in regional economics, and in economics more generally, a focus on computer output results.

But this is not to say there are no problems even when there is a wider focus, “While the theory underlying these models is often exceptionally well established and well received, nevertheless it is also true that there are cases in which spatial econometric work has been too casual in its attempt to base model specifications on economic theory.” In particular, Gibbons and Overman highlight the inadequate handling of hierarchies in regional science and spatial economics. Similarly, when reviewing the theoretical and empirical rationale for network dependence and spatial externalities embodied in spatially lagged variables, Luisa Corrado and Bernard Fingleton (2012) find that a failure to acknowledge their presence at least biases inference and can cause inconsistent estimation leading to incorrect assessment of causal processes.

3.7 Replication and Meta-Analysis

A simple glance over the publications in the regional science journals indicates an expanding number of empirical studies. The gradually increasing availability of data, the development of more sophisticated estimation procedures and software, and the wide variety of theoretical hypothesis that have been generated and in need of quantitative evaluation easily explain this. But there were also intellectual forces pressing for this. The work often, for example, pays particular attention to the role of transaction costs, largely in terms of transportation, and to market imperfections – an outcome of the work of Krugman and the like.

Both Meyer (1963) and Douglas Brown (1979), following earlier pleas from Isard, argued in the late 1960s and early 1970s that it was time regional science moved away from broad conceptualizing and toward the testing of hypothesis. Brown wrote “. . .instead of continuously re-specifying the theory, I strongly recommend that we set our sights on empirical testing.” Moves in this direction were already under way in economics in general, and regionally oriented research was part of this. Isserman (1995), however, raised the question about whether this was really being done scientifically. In particular, an important issue across many areas of social science involves the ability to replicate empirical results (Kane 1984). Application of applied scientific methods should produce results that can be reproduced to be valid.

There are a number of factors mitigating against conducting replication in the social sciences. Independent, direct replications of others’ findings can be time-consuming for the replicating individual or team and can take energy and resources away from other projects that reflect one’s own original thinking. Replications are also harder to publish, often because editors feel it is not original work and, even when accepted for publication, are seen as “bricklaying” exercises, rather than as major contributions to the field.

Despite this, the concern about non-replication has grown. It was a major theme at both the AEA and the Royal Economic Society (RES) annual meetings in 2017. For example, when discussing the role of empirical analysis in economics, James Berry et al. (2017) maintained at the AEA that “Replications are a key component in the scientific process, helping the profession sift robust empirical findings from mistakes.” Similarly, Maniadis et al. (2017) at the RES highlighted “. . . a widespread concern that there is a reproducibility problem due to a sizable fraction of published findings being typed-I errors, or false positives (i.e. scientific discoveries of statistical relations that are in fact not true).”²³

A challenge in replication is that of definition. Maren Duvendack et al. (2017) helped a little by consolidating two oft-used definitions. Michael Clemens (2017) separates replication from robustness tests, classifying “verification” (replication) as those using the same sample, population, and empirical specification; “reproduction” (replication) as those using different samples from the same population but using the same specification; “reanalysis” (robustness) using the same sample and population but different specifications; and “extension” (robustness) using different samples and populations but the same specification. Daniel Hamermesh (2007) separates “pure replications” (same methods, same sample and population) from “statistical replications” (different sample, same methods and population) and “scientific” replications (different sample and population, similar but not identical methods). Both agree on what is “pure replication” or “verification”; the “statistical replication” of Hamermesh corresponds to the “reproduction” of Clemens, while the “scientific replication” of the former incorporates the “robustness” categories defined by Clemens, although broader.

Then there is the matter of what leads to analysis that cannot be replicated. A number of possible factors have emerged. Duvendack et al. (2017) summarize them:

First is “HARKing,” or hypothesizing after the results are known. This practice turns hypothesis testing on its head, with theories being developed only after empirical results have been obtained, and then the same empirical results are used to “test” the theories.

²³Other papers include Chang and Li (2017) who replicated 22 of 67 economics papers that used the authors’ data and code files and additional 7 papers with assistance from the authors. Of articles using public data and making use of code written for software owned by the authors, 29 of 59 could be replicated. Replication has also involved several economic fields; Camerer et al. (2016) sought to replicate papers in experimental economics, Hamermesh (2017) labor economics, and Sandip Sukhtankar (2017) development economics.

Second is data mining and estimation manipulation, commonly known as “p-hacking,” by which researchers torture the data until they are able to produce the elusive $p < 0.05$. . . Third is data error and outright fraud. . . The last reason is publication bias, by which false positives are disproportionately reported in the literature.²⁴

But there are important changes taking place to encourage work that can be replicated. Economics journals with reproducibility policies are cited more often than others. Additionally, what are normally considered the top five economics journals now have a data access policy with authors required to make data and code available to all researchers to test for replication. For the minority of journals with a mandatory and enforced policy, this is significant when controlling for time and journal effects (Höfler 2017). But there are many journals that have no such requirement, or it is voluntary. There is far less discussion, however, of the lack of replication, and how to handle it, in the regional science literature.

Meta-data analysis, the synthesis of the results of prior studies adjusting for their context, is often seen as a method of replication and is perhaps more widely used in regional science than regional or other specialisms of economics. But there are important differences. Care is necessary when applying meta-analysis in regional science or economics because, unlike psychology or the health sciences, many empirical studies in economics are non-stochastic and analyze publicly available data, although dataset selection may differ between studies (Anderson and Kichkha 2017). Meta-analysis is also not “a scientific technique” – decisions are required regarding which studies to include, what weights to attach to the studies, and how to interpret the results.

Further, few meta-analyses of regional matters have delved back into the raw data when selecting prior works for inclusion. The problem is that there is no systematic way of objectively assessing the quality of studies. In particular, gray literature (e.g., reports and working papers) and those not written in English tend to be omitted. Added to this, the material selected from peer-reviewed journals generally suffers from bias. There is a tendency for editors to favor results that support existing theories or contain findings broadly conforming to “expected” magnitudes and to reject as outliers where finding radically different results from the norm.

A more pragmatic issue is the usefulness of findings for forecasting. Milton Friedman (1953) provided a practical, ex post criteria for assessing the quality of any analysis, namely, that it should predict well or at least meet the needs of those who seek to use it for predictive or forecasting purposes. What we do know is that most analysis published in all fields concerned with regional matters is essentially cliometrics or historical econometrics in nature. It is based on past, revealed

²⁴Edward Leamer (1983) highlights “p-hacking.” “The econometric art as it is practiced at the computer terminal involves fitting many, perhaps thousands, of statistical models. One or several that the researcher finds pleasing are selected for reporting purposes. This research for a model is often well intended, but there can be no doubt that such a specification search invalidates the traditional theories of inference.” The situation was put bluntly by the Nobel Prize winner, Ronald Coase (cited in Gordon Tullock 2001), when he joked, “If you torture the data long enough, Nature will confess.”

preference data with all the challenges that this introduces for using the findings for predict purposes. Further, there are few studies that have conducted ex post analysis of the accuracy of predictions – perhaps this is because they will not be published, or it may be because checking results can prove embarrassing. Certainly, from what we know in some sub-fields within regional analysis, such as transportation (Flyvbjerg et al. 2005), forecasts can prove to be highly inaccurate. The picture is not, though, altogether bleak. Although still in the minority, there is perhaps a greater proclivity to favor stated-preference data and methodologies in regional science journals than in regional economics, although this is more of an educated guess than a scientifically supported fact. The former approach, by definition, at least seeks to introduce some forward-oriented indicators of expectations into the analysis. But the forecasting reliability of stated-preference models has also not been explored in any depth by those involved in regional analysis.

3.8 Conclusions

So, what do we conclude from these various peeps at the differences in regional economics and regional science? First, economics has from the beginning played a major, indeed dominant role in regional science, and, if anything, this has increased over time. Back in the mid-1990s, Isserman (1995) found that economists accounted for 70% of the authors to the *Journal of Regional Science*, 79% (perhaps not surprisingly) of those in *Regional Science and Urban Economics*, but under 30% of those in *Papers of the Regional Science Association*. By 2018, I find the proportions have changed a little for the *Journal of Regional Science* and *Regional Science and Urban Economics* with economists now account for 63% of the authors publishing in the *Papers in Regional Science*, the successor to *Papers of the Regional Science Association*.²⁵

Secondly, it can now hardly be claimed, as did the founders of regional science, that economists pay too little attention to spatial differences in economic behavior. I simply cite the reason Paul Krugman was awarded the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel in 2008. It was “. . . for his analysis of trade patterns and location of economic activity.”²⁶ Although, while perhaps a complaint could be that Isard was neglected for the award, one should also recognize that the Nobel Prize has been awarded to Daniel McFadden (recipient in 2002) for his work refining discrete analysis, an approach widely used in spatial economics; Tinbergen (recipient in 1969) who published on a variety of regional topics,

²⁵The proportion may be even larger. Those not recording a specific department are classified as noneconomists.

²⁶Isard (1956) argues that economics, “. . . rarely obtains depth of analysis in that area which touches upon the broad influence of space and physical environment upon man’s behaviour and land utilization patterns.”

including in *Papers of the Regional Science Association*; and Wassily Leontief (recipient in 1973) who deployed his input-output analysis extensively at the regional as well as at the national level – e.g., Leontief (1953). And more recently, Paul Romer’s (recipient in 2018) work on endogenous growth theory has a strong spatial element to it, most notably in terms of the role of charter cities.

Giarratani view that there are now proportionally fewer courses focusing on regional economics or regional science than there were in the period of the 1950s through to the 1970s is perhaps true. But in absolute terms, the sheer global increase in university education makes it unlikely that the study of spatial matters has declined. Also, there has been an increased internationalization in the subject matter both as global economic growth has taken place and as larger economic units, such as the European Union, that has led to new definitions and forms of political regions requiring different forms of study. The shifts towards market economies in Eastern and Central Europe, together with the economic changes in China and other emerging economies, have raised interesting questions centered around paths of transition which extend beyond the traditional boundaries of regional science. Added to this, there are now more interdisciplinary departments and courses at universities, and many contain elements of what would in the past have gone under the guise of regional science or regional economics.

But having said this, and coming back to the original question in the chapter’s title, economics still dominates regional matters. One of economics’ emergent advantages has been its more catholic approach to the subject matter of interest and a shift away from the rigidities of focusing on *homo economicus* and from “the stifling influence of the great but limited neoclassical tradition.” This has embraced the growth of behavioral and institutional economics, as well as developing new techniques of analysis such as experimental economics.²⁷ While analyses of regions have not always been at the forefront of this work, the evolving methodologies do reflect a continual changing and flexible attitude in the economics discipline. Regional science, however, seems to have been less flexible in terms of the assumptions being made when modeling and in the range of issues it is willing to address. It still in many ways lingers in the 1950s and the 1960s.

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²⁷The Nobel speeches of Richard Thaler (2018) and Vernon Smith (2003), respectively, highlight the nature of these approaches.

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