NARSC NEWS

Words from the Executive Director

Welcome to this issue of NARSC Newsletter. Thanks to Isabelle Nilsson and Ran Wei for pulling together another great issue. 2019 is a significant year for Regional Science. It is the 100th anniversary of the birth of our founder, Walter Isard. Walter was born on April 19, 1919 in the city of Philadelphia, Pennsylvania. To mark this occasion, Isabelle and Ran contacted a number of North American Regional Scientists and asked each of them to write a short piece on emerging themes and directions in Regional Science. You can find these pieces in this Newsletter. I hope that you enjoy them, and that they provide you with some intellectual nourishment.

At this time of year, we start to think about the upcoming North American Meetings of the Regional Science Association International. This will be our 66th annual meeting. The meetings will be held at the historic Omni William Penn Hotel in the heart of vibrant downtown Pittsburgh, Pennsylvania. The dates of the conference are November 13-16. If you would like to join us, please consider submitting an abstract. The deadline for abstract submission is July 1. As usual, there will be a number of special organized sessions at this year's conference. If you are interested in participating in one of these, please contact the session organizers. Detailed information about the conference, including special organized sessions, can be found under the Conference tab at http://www.narsc.org/newsite/conference/. If you are a graduate student, I encourage you to consider entering one of our graduate student paper competitions. We have two paper competitions for graduate students – the Graduate-Student-Author Paper Competition and the Graduate-Student-Led Paper Competition. More details about each of these can be found http://www.narsc.org/newsite/awards-prizes/narsc-student-competitions/. I wish everyone a pleasant and productive summer and look forward to seeing you in Pittsburgh in November.

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Words from the Editors


We are delighted to bring you the latest issue of the North American Regional Science (NARSC) newsletter. This June 2019 edition of the newsletter features a series of short essays by some prominent regional scientist who reflect on emerging themes in our field. It also highlights recently funded research and published books by our members as well as this year's recipient of the Benjamin H. Stevens Graduate Fellowship in Regional Science. If you have ideas or suggestions regarding content or would like to contribute to the newsletter, please do not hesitate to contact us.

We looking forward to seeing all of you at the NARSC meeting in Pittsburgh in November.

Isabelle Nilsson and Ran Wei

Newsletter Co-Editors

Regional Science: Problem Driven, Interdisciplinary, and Policy Relevant

by Kieran P. Donaghy

In his 1975 *Introduction to Regional Science*, Walter Isard defined regional science as a discipline that "concerns the careful and patient study of social problems with regional or spatial dimensions, employing diverse combinations of analytical and empirical research (p.2)." And while the interdisciplinary approach it takes to the study of social problems is what makes regional science somewhat unique, it is not just a magpie's discipline. For, Isard wrote in his 2003 *History of Regional Science and the Regional Science Association International*, "It has come to have its own peculiar core and wholeness … and it is forging [its own] tools and techniques accordingly (p. 187)."

The careful and patient study of social problems in which regional scientists engage is not in the pursuit of knowledge for its own sake but rather actionable knowledge that is grounded in particular circumstances and will help solve particular problems. In elaborating further on his 1975 definition, Isard noted in his *History* that "Regional science concentrates its attention upon human behavior and institutions; … [on] social processes … (ibid, p. 188)." The social processes to which he alluded certainly include processes of conflict resolution. In much of his later work he emphasized that there was no substitute for scholars, who address social problems with regional and spatial dimensions, immersing themselves in the history of conflicts from which people seek to be extricated. He added that regional scientists must give consideration and be sensitive to "key administrative, cultural, political and other social factors (ibid, p.193)."

From the above reflections on Walter Isard's view of the discipline he was instrumental in establishing, we can infer that regional science has from its earliest days been 'problem driven, interdisciplinary, and policy relevant.' If it is social problems that give the discipline meaning and content, such problems have also elicited learned borrowing from other fields, in the form of behavioral theories, and new methodological developments—the tools and techniques the field has forged. And if the chapters of

Methods of Regional Analysis (Isard et al., 1960) provide a representative sample, among the behavioral theories and tools and techniques regional science borrowed or developed in just its first 15 years were those concerned with modeling population growth and migration, measuring regional income and constructing social accounts, characterizing flows of commodities and money, tracking regional business cycles, explaining industrial location, analyzing spatial interaction, market areas, and service coverage, characterizing interindustry and interregional trade, identifying potential industrial complexes, and setting societal goals. (From these subjects alone one can see that regional science has contributed much to the analytical tool box of contemporary city and regional planning; for several decades *Methods* served as the primary textbook of Barclay Jones's planning methods course at Cornell University.)

But if one scans a few decades of tables of contents of such journals as *Papers in Regional Science*, the *Journal of Regional Science*, the *Annals of Regional Science*, or the *International Regional Science Review*, to name just four journals in the field, it quickly becomes evident that the scope of topics regional scientists have been studying over the 65 years of their discipline far exceeds what *Methods* encompassed. It includes land use and real estate development, passenger and freight transportation or, more generally, network operation, infrastructure systems of all sorts, economic development and the problems of lagging regions, environmental problems and ecological systems behavior, disaster preparedness and response, city systems, growth and trade, technical change and innovation, industrial clustering and all aspects of urbanization and agglomeration economies, industrial restructuring and impacts on regional labor markets, and data and methods needed to study these topics. More recently, regional scientists have turned their attention to such subjects as globalization and the fragmentation of production and distribution, climate change and the resilience of settlements to sea-level rise and extreme weather events, education and the formation of human and social capital, social inequality, managing the transition to more circular economies, path dependence and other emergent properties of complex dynamical systems, 'smart' technologies and the internet of things, the opportunities and challenges of big data, and regional policies that promote diversity, the integration of spaces, and inclusiveness.

In studying these topics regional scientists are of necessity engaging in new types of interdisciplinarity that involve computer scientists, data scientists, spatial modelers, operations researchers, atmospheric scientists, urban designers and architects, cultural anthropologists, and mediation experts. And they are doing so with the intent of contributing theoretical and practical knowledge to the formulation and application of policy solutions at various spatial scales. In this issue of the NARSC News, several of your colleagues are surveying new areas of research activity. The new work they survey provides evidence of the vitality of regional science, its adaptability to new social problems with regional or spatial dimensions, and the continuing and urgent need for the kind of work that regional scientists do.

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Emerging Themes in Regional Science

by Daniel A. Griffith

My long history of NARSC experience entails participating in virtually all of its annual meetings since 1978, and serving as its president in 1996/97. My NARSC knowledge concentrates in the areas of spatial statistics/econometrics, location theory, and urban economics, not the full breath of topics appearing in NARSC programs. Not surprisingly, many past and present session themes will continue to be future session themes of NARSC meetings. Here I comment about what I believe are some of the emerging themes (also see Griffith 2018, 2019) that will supplement these others.

One distinguishing feature of spatial economies today is the closure of especially facilities in multi-locational firms. Expansion through the addition of new facility locations is one hallmark of many past decades. Starbucks and Subway sought to have the most outlet locations in the world. Subway overtook McDonald's in 2010, becoming the world's largest fast food chain; but by 2016, it began implementing a serious contraction strategy. Starbucks has become the world's largest coffeehouse company, but only after surmounting a 2008 near disaster; since its 1972 beginning, Starbucks has closed only 443 outlets (209 in 2009, 42 in 2010, and 161 in 2011), recently announcing plans to open 2,100 (while also closing 150) outlets in 2019. These multi-locational successes have moved from a pure expansion phase into a simultaneous expanding and contracting phase. Many, many more firms have been less successful, and have moved into a rationalization and almost pure contraction phase, including (2019 closures): Payless (all), Gymboree/Crazy 8 (724), Sears (72), Victoria's Secret (53), Kmart (48), Lowe's (20), JC Penny (27), Macy's (8), Winn Dixie (7), and United States Postal Service post offices (10+). Although much dynamic location-allocation research, for example, has focused on expansion, far more attention will shift to contraction. An accompanying emerging theme is negative spatial autocorrelation (NSA), one of spatial statistics/econometrics' most neglected concepts. NSA relates to geographic competition; although its detection has been rare to date, market area redistributions affiliated with outlet closings will make it a future research topic.

Another emerging theme is the relationship between SA and spatial optimization solutions. For example, the majority theorem (Witzgall 1964) states that the p = 1 median continuous space location-allocation problem with n > p demand points, Euclidean distance, and a single weight $w_k > \frac{\sum_{i=1}^{n} w_i}{2}$ has the demand point (x_k, y_k) as its optimal solution. This solution location constitutes a local Getis-Ord statistics hot spot. A brand-new finding is that this hot spot also is in the optimal solution set for p > 1. In addition, the optimal solution for a uniform distribution of weights distributed across a P-by-Q regular square grid is [c(P+1)/2, c(Q+1)/2], where c is the spacing between consecutive grid points. This SA-spatial optimization topic also has been neglected in the regional science literature, and will become a future research topic.

One unanswered question accompanying the contemporary shift to space-time data analyses asks about the relative roles of spatial and temporal autocorrelation. Because a time series involves a one-dimensional and one-directional data sequence with a single boundary/edge (i.e., a series' beginning),

temporal autocorrelation often is much stronger than SA, sometimes reaching 0.99, rather than the common 0.4-0.6 for socio-economic/demographic data, or 0.9 for remotely sensed data, of SA. However, this scenario changes when a catastrophe/interruption occurs: two consecutive years of Dallas population are highly correlated, a feature Hurricane Katrina corrupted in the New Orleans population time series. These notions have spawned the research theme of "when space beats time." During such disruptions, SA tends to be more prominent than temporal autocorrelation, a notion constituting a future research topic.

One final noteworthy emerging theme is Moran eigenvector spatial filtering (MESF), a novel methodology for handling SA in regression analysis. It employs eigenvectors of a modified spatial weights matrix, rewritten for calculating the Moran coefficient, as synthetic covariates in a regression equation to filter SA out of the residuals and add it to the intercept term. Hughes and Haran (2013) as well as Burden et al. (2015) cast MESF in terms of modern reduce rank statistical analysis, whereas Legendre and his collaborators (e.g., Brind'Amour et al., 2018) cast it in terms of inter-locational distances. With regard to spatial autoregression, MESF circumvents mathematical intractabilities (e.g., the new normalizing constants required for reformulated probability density/mass functions), reduces the numerical intensity of spatial statistical calculations (e.g., the discarding of Markov chain Monte Carlo [MCMC] techniques), and accommodates positive (even for autocorrelated Poisson and negative binomial random variables), negative (even for exponential random variables), or both positive and negative SA mixtures latent in georeferenced data. In addition, MESF allows visualization of SA for individual georeferenced datasets. Chun and Griffith (2019) recently established how to implement MESF for massively large remotely sensed images. MESF is a future research topic, too.

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Social and Economic Impacts of Transportation Interventions: Causal Identification and Spatial Interactions

by Eleni Bardaka

Transportation interventions, either in the form of infrastructure investments or policies, can have substantial impacts in the urban structure and the socioeconomic composition of neighborhoods. Today, urban areas are facing numerous challenges with adverse effects in the quality of life of their residents, including loss of housing affordability, fast growth, urban sprawl, decentralization of low-income households, gentrification, and segregation. Regional scientists interested in understanding the role of transportation interventions in the aforementioned phenomena are faced with the difficult task of disentangling the causal effects of transportation from other interventions and concurrent economic forces while accounting for the spatial dynamic nature of the urban phenomena being studied.

This research goal has recently become more attainable given certain methodological contributions that combine quasi-experimental econometric methods with spatial econometric models. For example, Delgado and Florax (2015) presented a spatial extension of the benchmark difference-in-differences (DID) model that accounts for potential spatial spillover effects local to the treatment via the separate identification of direct (effect of the treatment of unit i on unit i) and indirect effects (effect of the treatment of unit i's neighbors on unit i). Similarly, Dubé et al. (2014) proposed a spatial extension of the repeat sales model that incorporates a spatially lagged dependent variable to account for global spatial spillover effects. Such methods can improve our understanding of the spatial processes associated with the impacts of transportation interventions and simultaneously resolve potential issues related to the contamination of the control group due the presence of indirect effects. Empirical applications have been limited and have primarily focused on the impacts of transit investments and accompanying transit-oriented developments. Dubé et al. (2014) used their proposed model to estimate the effects of the commuter rail transit system in Montreal, Canada on residential property values. In another example, Bardaka et al. (2018) used the spatial DID method proposed by Delgado and Florax (2015) and a panel data estimator with spatial error components to study gentrification in the neighborhoods around the first line of the Denver light rail, Colorado; they found, among others, that station-area neighborhoods experienced noteworthy direct and indirect impacts in terms of median household income and housing values due to the light rail system, while those impacts varied by percentage of directly treated neighbors and definition of proximity (Figure 1). It should be noted here that studies that focus on the causal impacts of transportation interventions but do not account for spatial interactions (see for example, Kahn, 2007 and Canales et al., 2019)have also been limited. To this end, there are still several key research questions that need to be addressed within this research strain, some of which are discussed herein:

Given a type of transportation infrastructure investment (for example, urban rail), could the initial socio-demographic composition of the affected neighborhoods lead to different socioeconomic outcomes? Nilsson and Delmelle (2018) studied the likelihood of neighborhood change following rail transit investments in nine metropolitan areas in the US, and among other results, they found that low-income neighborhoods are more likely to experience socioeconomic changes. It is therefore important

to analyze multiple regions and provide insight into the effect of the initial neighborhood composition on the studied socioeconomic outcomes.

What is the temporal and spatial distribution of the socioeconomic impacts? Specifically, are there strong anticipation effects? Regarding the post-treatment period, do the effects appear as a one-time shock or are there long-term implications? How are the direct and indirect effects distributed spatially? Some of these questions have been investigated using descriptive analysis and standard hedonic pricing techniques but not using (spatial) quasi-experimental methods. In such empirical analyses, additional complexity related to the simultaneous or sequential emergence of multiple transportation investments in proximate locations (such as the addition of rail lines over time) may arise; this can be accounted for in the quasi-experimental framework (see Bardaka et al., 2019 for a relevant approach) providing the opportunity to identify individual and cumulative effects of different systems.

Last, the economic impacts of transportation connectivity have not be adequately explored. Indeed, the aforementioned research has focused on the effects of transportation investments irrespective of the degree of connectivity they provide. Recent advances in the estimation of network-based structural models enable the investigation of transportation network connectivity impacts, a topic of high importance to developing regions interested in improving network connectivity while achieving the highest economic benefit.

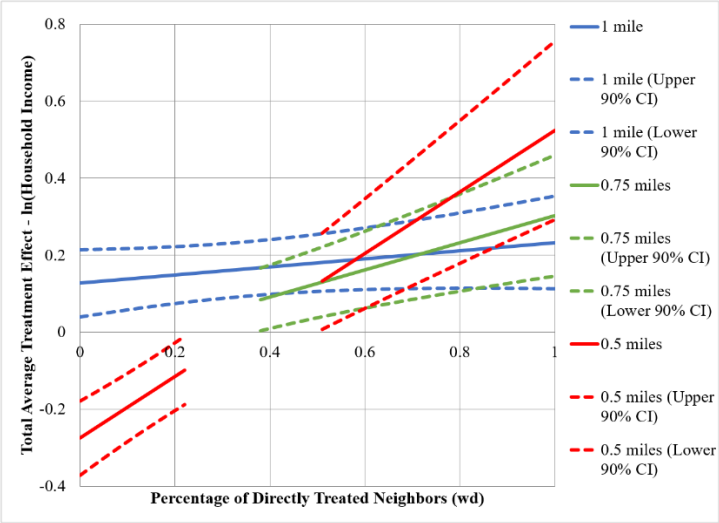

Figure 1. Total average treatment effect of the first Denver light rail line on median household income for different proximity definitions and percentage of directly treated neighbors
Source: Bardaka et al., 2018.

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More Directions for Research in Regional Science

by Gordon F. Mulligan

"Gordon Mulligan
L'Aquila, Italy June 2019
Courtesy of Bruce Newbold"

A few years ago, the editors of the *Australasian Journal of Regional Studies* asked me, perhaps mistakenly, to write something about emerging or promising trends in the research of regional science (Mulligan 2014). But, before starting on that project, I decided to revisit the early literature if only to get a sense of the spirit and scope of inquiry in that different era. It was soon apparent that there was much wisdom to be found in the words of people like Edgar Hoover, Raymond Vernon, Charles Tiebout, William Alonso, and, of course, Walter Isard. Many of these scholars, now thought of as the *Great Minds in Regional Science*, exhibited remarkably wide interests in providing a better understanding of the location of human activities and the spatial aspects of human development.

Compared to that earlier time, it seems that our research has narrowed considerably—to the point where new theoretical work is not that revealing, and empirical work is being driven less by important questions and more by the availability of new data or the demonstration of new techniques. On the other hand, I don't believe that we have entered that dull period of inquiry that Thomas Kuhn called normal science. In fact, a strong case can be made that we have simply restricted our collective imagination by becoming overly attached to a couple of very influential paradigms. The first of these is the New Economic Geography, which brought the ideas of Paul Krugman and, especially, Masahisa Fujita and Jacques-François Thisse (2002) to the fore. Their ideas continue to dominate, but also constrain, our thinking about land use, geographic agglomeration, spatial externalities, and city systems, while the many NEG-inspired models have become more and more complex. The second paradigm, in some ways even more significant, emerged in spatial statistics and then became the field of spatial econometrics. Many of the early ideas came from Andrew Cliff

and Keith Ord (1981), while the adaptation and extension of these ideas to inferential models, like regression, was led by people like Jean Paelinck, Luc Anselin (1988), and Harry Kelejian. Together, these two dominant paradigms have motivated much of the most cited research in regional science over the past quarter century.

However, in my opinion, too many papers have been written that conform to the "questions" and "guidelines" set down by these two paradigms. Please don't get me wrong—regional science has benefited greatly from each—but, in doing so, the discipline has failed to take full notice of the many things that have changed in the world during the past few decades. So, today, I am often more enthusiastic about magazines like *Bloomberg Businessweek* or *The Economist*, or books written by people like Angus Deaton (2013) or Mariana Mazzucato (2015), than I am about the papers currently appearing in our regional science journals.

That said, I will use this second opportunity to suggest some other promising research avenues for junior scholars in regional science. Here my thoughts will be confined to four areas that are broader than those that were highlighted in the *AJRS* piece. Moreover, readers familiar with that earlier paper should detect a new sense of urgency for useful research in each of the following areas: (1) the tensions arising between the center and periphery at various geographic scales; (2) the looming environmental catastrophes related to rapid climate change; (3) the severe problems that plague primate mega-cities; and (4) the uneven growth due to disruptive innovations in the knowledge economy.

Center versus Periphery. Given the litany of books on inequality written by Thomas Piketty (2014), and others, it now seems that the immediate post World War II era was an anomaly. Not only did household incomes converge for some thirty years, but long-standing center-versus-periphery tensions were largely held in abatement. But then matters reversed, long suppressed regional tensions were suddenly released, and many nations began to face serious conflicts between the more conservative low-density peripheries and the more liberal metropolitan centers. (Of course, W. B. Yeats warned us a century ago in *The Second Coming* that "Things fall apart; the centre cannot hold").

But should this be surprising? Physical capital steadily and relentlessly replaced labor in the traditional industries of the periphery and, concomitantly, the emerging occupations of the specialized accounting, legal, and financial services flourished in the center. At the same time governments, of all levels, grew in both size and influence, and these public workers were largely housed in the center. Selective out-migration, which continues even today, led the best and brightest away from the periphery and they rarely returned. With ageing, however, the growth in government revenues stalled and the provision of public goods and services began to erode—but less in the center than in the periphery. Even more important, the growing numbers of workers residing in the center were able to benefit from ever-increasing home values, which allowed them to access unearned financial capital that could be used for private schooling, specialized health care, or a second residence. The result has been that the trust once connecting the inhabitants of the periphery to those of the center has nearly vanished. In fact, we live in an era when many national and regional governments have lost almost all contact with the inhabitants of small cities and rural areas.

For obvious reasons, European regional scientists have been more involved in monitoring interregional tensions or gauging the prospects for the success of multi-regional integration. But, unfortunately, regional science has not provided any convincing theory on these topics that can match the perspectives offered up by either the Marxists or the world-systems scholars. Furthermore, we have not learned

much from visionaries like Douglass North (2005, p. 7) who stressed that "Disorder—revolution, lack of personal security, chaos—has characterized a great deal of the human condition," simply because irrationalities can always arise in human behavior and instabilities can always arise in political or economic markets. But North also persuaded us that institutions—rules, norms, and sanctions—have been indispensable in allowing human activities to become highly organized in both space and time. However, when the rules of the game are changed, especially in a setting of scarcity, confusion and chaos will invariably ensue. Today, in many nations, the residents of the periphery feel that the elite of the center—private and public decision-makers, media and entertainment stars, and even academics—have in fact changed the rules to benefit themselves and there is growing evidence that they are not wrong.

Surely regional science has a role to play here. We could do much more in the research area of social capital, perhaps even revisiting the long-standing debate between advocating people-based policies or place-based policies. It seems that metropolitan decision-makers often forget that the towns and small cities of the periphery, now sometimes called micropolitan areas, are also locations where shifting global forces ultimately become realized. Regional scientists could also improve quality-of-life studies, which are often deficient in both coverage and consistency, so that exchange-based generalizations like Easterlin's paradox might apply to a somewhat wider range of human activity (Glatzer et al. 2015). Also, people in the periphery cannot feel part of a wider regional or national community when their personal choices at the ballot box, however misguided, are often determined by those occupying the center. In any case, we really need new conceptual and analytical work, informed by history and a knowledge of institutions, to improve our understanding of the strained relationships that now persist between the various centers and peripheries across the entire development spectrum.

Consequences of Climate Change. Like many regional scientists I was long skeptical about the findings of the research focusing on climate change. In part, I was not convinced by the tenuous explanations coming out of physics or chemistry about the connections between carbon emissions and global warming. In part, too, I believed that financial markets would react more strenuously to extreme natural events if matters were really becoming that serious. So, I sat silently in a camp, along with many others, who viewed a media-hyped stream of financial losses as being largely due to the destruction of valuable properties that should never have been allowed in areas highly prone to natural disasters. But a game-changer for me was reading Nicholas Stern's (2015) *Why are We Waiting?* He persuaded me that we have likely failed to properly discount the costs of disastrous future events and that the future price of "buying down" environmental damage might be a lot higher than we currently anticipate. While I wouldn't go so far as to say I became a Green convert, I now feel that national governments must provide reasonable energy-transition plans, with firm yet reasonable time horizons, for reducing private and public carbon emissions so that entrepreneurs and investors, of all types, can better understand the rules of the game.

I'm not sure that regional scientists have that much to contribute to the climate change literature *per se*, but we certainly can responsibly inform private and public agents about various matters that will be affected by severe climate change. As already mentioned in my *AJRS* paper, we can do much to help local and regional governments estimate the costs of alternative mitigation measures, and to offer location-specific estimates of the economic impacts that will accompany the inevitable reconstruction of damaged buildings and infrastructure. Moreover, we can provide advice on the best ways to include more resiliency, or redundancy, in complex global supply chains or in daily metropolitan commuting

patterns. Finally, there is growing evidence—in other disciplines—that natural disasters exacerbate existing wealth inequalities thanks to the especially generous insurance payouts that flow to the richest homeowners. So, those center-versus-periphery conflicts discussed above are sure to arise in the research on natural hazards as well. Even if the climate change being experienced today is not entirely due to human activities, these would surely be useful research topics to address in any case.

Primacy and Mega-Cities. While Mark Jefferson wrote about the dominating, primate city back in the late 1930s, it wasn't until Peter Hall (1984) first coined the term *world cities* during the 1960s that many people became aware of the common problems shared by the world's greatest cities. At that time, Hall focused on only eight great cities although by 1980 some ten cities had more than ten million residents; today there are some fifty cities with more than ten million inhabitants. In the more developed economies urbanization often responded slowly to industrialization but in the less developed economies urbanization has rapidly preceded industrialization. The best-known explanations for the rapid increases in numbers seen in the mega-cities of the poorer nations have been the Harris-Todaro (1970) migration model and the series of multi-sector econometric models outlined by Jeffrey Williamson (1988) and his colleagues.

At the level of national city systems a few regional scientists have made substantial contributions. Vernon Henderson (1987), for one, pointed out some time ago that many developing nations gained scale advantages by focusing industrial investments in large, specialized cities while, in the more developed nations, this industrial specialization was often restricted to smaller, mid-sized cities located in the periphery. As a result, industrial pollution has tended to be more concentrated in those poorer economies. Since that time Henderson has moved on to work on assessing the economic penalties of having economic over-concentration in national city systems, arguing that efficient transportation systems can do much to reduce the spatial inequities in growth that often accompany excessive urban primacy.

But it seems to me that regional scientists could contribute a lot more to this research area. People working in the provision of public facilities could provide valuable guidance as to the best way to design, in the face of annual budget constraints, the various delivery systems desperately needed for health and education in the mega-cities of the Third World. Better projections of future populations would also assist planners in acquiring enough land to meet future housing needs or to provide replacement housing when people are displaced for much-needed infrastructure projects. In any case there are already some useful suggestions for offering this guidance in a responsible way, either by introducing more justice into public decision-making (Massam 1993) or by conferring different amounts of power to the relevant private and public agents (Batty 2013). It is interesting, too, that some nations, including Mexico and Norway, are finally experimenting with moving public workers from the center to the periphery, but to date the overall benefits have been mixed.

Knowledge and Disruption. The most advanced and richest economies have undergone remarkable changes during the first half-century of post-industrialism. Much has been written about the decline of traditional industries and the rise of the so-called knowledge-based industries. In addition to features like market networks and firm scalability, several aspects of this transformation have been of special interest to regional scientists. First, there has been growing appreciation of the roles of entrepreneurship and innovation in determining the differential growth rates of metropolitan regions (Glaeser *et al*. 2009). Second, we now have a more nuanced locational understanding of the different cognitive skills that are needed in order to sustain this transformation. Third, we now realize that many

of today's new firms and industries only thrive when they can co-locate in dense ecosystems that provide access to thick and flexible labor markets, risk-taking financial agents, and efficient infrastructure.

However, in many nations like the U.S., some urban regions have become significantly wealthier, richer in human capital, more productive, and more innovative while a second group of those urban regions has fallen farther and farther behind. This wealth-sorting process has been more complicated than a simple center-versus-periphery polarization would suggest. Moretti (2012), among others, believes that a permanent gap—based largely on region or location—has taken place in the life prospects for the tens of millions of America's metropolitan inhabitants.

Regional scientists have given this issue some thought but a lot more could be done. It seems to me that in many nations a space-time adjustment process is inexorably unfolding, accompanied by periodic shocks, where some metropolitan areas continue to prosper because of superior advantages that are being constantly reinforced or upgraded, while the very opposite transpires in the declining areas. Over time this adjustment process eventually leads to the sorts of significant interregional gaps that Moretti is concerned about. In regional science we enjoy considerable familiarity with these sorts of adjustment models, and they could be used to trace out the local properties of the "dynamic" relationship that exists between population and employment across any nation's economic landscape. Population is attracted to those metropolitan areas that offer rich natural and human-made amenities while employment is attracted to those areas that maintain growing industries and offer good wages. Another possibility, of course, would be to use those adjustment models to examine the place-specific features of the ever-changing relationship that exists between wages and housing costs. Regional scientists have carried out insightful hedonic studies uncovering the capitalized trade-offs that persist between high amenities and low wages, but the findings of these studies have not been adequately incorporated into long-term studies of metropolitan growth or decline.

In short, I am recommending more research in the richer nations on the underpinnings of long-term growth in metropolitan economies. More work needs to be done to clarify how such matters as patents, self-employment, and firm entries or exits are tied to long-term patterns of economic growth. Other work would be welcome that might clarify how the shifting demographic features of these economies affect the prospects for future growth. And other efforts, both of an analytical and institutional nature, are needed to clarify how these so-called innovation ecosystems differentially affect both the patenting and subsequent adoption of new products and processes.

In many ways my recent thoughts have been shaped by the writings of Edmund Burke, who saw society as an organic partnership between the living, the dead, and those who are yet to come. I believe a similar type of intellectual contract binds together the various members of a disciplinary community. Hopefully the next generation of Hoovers, Alonsos, and Isards will find a little wisdom in this essay.

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Gordon F. Mulligan is a Professor Emeritus at the School of Geography and Development at the University of Arizona.

NARSC Members' Recent Grant Awards

Funding Agency: USDA National Institute of Food and Agriculture
Amount: $474,880
Project Participants: Stephan J. Goetz
Project summary: *The Northeast Regional Center for Rural Development (9/1/2018-8/31/2019):*The Regional Rural Development Centers (RRDCs) play a unique role in USDA's service to rural America. They link the research and educational outreach capacity of the nation's public universities with communities, local decision-makers, entrepreneurs, families, and farmers and ranchers to help address a wide range of development issues. They collaborate on national issues that span regions — like e-commerce, the

changing interface between rural, suburban, and urban places, and workforce quality and jobs creation. Each tailors programs to address particular needs in its region. The Northeast Center, which serves the states from Maine to West Virginia and the District of Columbia, conducts research aimed at identifying the underlying causes and effects of the region's lagging economic recovery following the 2008 recession. Specifically, the major challenge areas we propose to address include: those related to the economy including workforce development; environment including loss of farmland; health, substance abuse, and addiction; and infrastructure including food systems development. We also will continue to connect educators across the region who might otherwise feel isolated.

Funding Agency: USDA National Institute of Food and Agriculture
Amount: $500,000
Project Participants: Stephan J. Goetz, Timothy Wojan, Anil Rupasingha
Project summary: *The Role of Innovation in Rural Firm Emergence and Vitality (5/1/2018 - 4/30/2021):* The major goals of this project are to deepen our understanding of whether and how entrepreneurial innovation can mitigate the growing economic threats facing rural U.S. workers and communities. Our working hypothesis, which is supported by preliminary research, is that innovation activity is much more widely distributed over space than previously thought. However, definitive tests of the impact of rural innovation on employment, wages, productivity, exports or survivability will require linking the 2014 innovation measures in REIS to subsequent performance measures available in administrative and survey datasets compiled by the Census Bureau. The supporting goals are four-fold. First, we seek to assess the role that innovation plays in the competitiveness of rural nonfarm business. Second, we will assess how community and business characteristics affect entrepreneurship as well as the innovation orientation of rural business. Third, we will compare two different datasets that capture innovation activity, with the goal of designing better innovation indicators. Fourth, we will disseminate knowledge and research insights to expand awareness among interested stakeholders of the potential for rural innovation, or lack thereof.

Funding Agency: US Department of Agriculture, National Institute of Food and Agriculture, Agriculture and Food Research Initiative
Amount: $500,000
Project Participants: Alison Davis, SuZanne Troske, Jenny Minier, Michael Clark, Bethany Paris, Christina Studts, Jennifer Hunter, Thomas Harris
Project summary: The goal of this 3-year project is to improve our understanding of the role of healthcare and a healthy workforce as determinants of local economic development in rural communities. Specifically, our working hypothesis is that while healthcare itself is an important driver of local economic growth in rural communities, it is also a significant factor in both firm and residential location decisions. Through this research we will better understand how a change in the number and type of healthcare businesses impacts changes in employment and wages of both healthcare and non-healthcare related industries in rural communities across the United States. The project objectives are accomplished through an exploration of big data that has been largely underutilized for rural economic development purposes:
Objective 1. Measure the role of healthcare as determinants of local economic development in rural communities
Objective 2: Estimate the role a healthy workforce plays in firm location and retention decisions.

Objective 3: Explore regional differences in the relationship between the healthcare industry and rural economic development.

We will examine these issues using the U.S. Census Longitudinal Business Database and the Annual Services Survey among others available at the University of Kentucky Federal Statistical Research Data Center.

Funding Agency: United States Department of Agriculture, National Institute of Food and Agriculture (USDA-NIFA)
Amount:$500,000
Project Participants: Craig Wesley Carpenter (PI), Charles Tolbert (Co-PI), Rick Peterson (Co-PI)
Project summary: This project uses confidential restricted-access government databases to spur rural economic growth by providing research-based knowledge of, and support for military veteran entrepreneurs, or "vetrepreneurs." Publically available datasets limit the ability to investigate entrepreneurial subgroups like veterans, which account for about one in ten entrepreneurs in the U.S., and are disproportionately located in rural areas. Thus, numerous questions remain unanswered for vetrepreneurs. For example, are there community factors that affect the growth and decline of rural vetrepreneur self-employment? Are there unique challenges faced by women, and ethnic or racial minority vetrepreneurs? In turn, what research-based policies promote the sustainability of these establishments?

The project PI and co-PI will employ their affiliation with the Texas Federal Statistical Research Data Center to access millions of observations from nationally representative samples. This detailed microdata allows for the examination of numerous factors including race, age, sex, education, previous experience, veteran status, disability status, financing source and amount, and business location, among numerous others. Further, this project will start and end with vetrepreneur focus groups to inform and provide feedback between our research and Extension efforts. The project will culminate in the development of recommendations for vetrepreneur support programs based on the research.

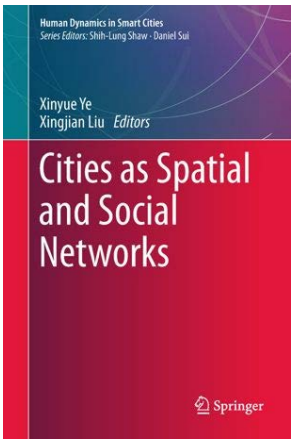
Funding Agency: U.S. Economic Development Administration
Amount: $1.6 million EDA/$400,000 match: Total $2 million
Project Participants: Principal Investigator: G. Jason Jolley, Ph.D. Professor, Voinovich School of Leadership and Public Affairs, Ohio University.
Project summary: Ohio University's Voinovich School of Leadership and Public Affairs, in partnership with the Ohio Valley Regional Development Commission (OVRDC), was awarded funding under EDA's 2018 Assistance to Coal Communities program to development and launch the new Building Opportunities Beyond Coal Accelerating Transition (BOBCAT) Network project. The BOBCAT Network is a regional development project that will promote entrepreneurship, support economic diversification, and identify infrastructure and workforce needs in Southeast Ohio. Project tasks include assisting with economic recovery efforts in Adams County where two coal-fired power plants are closing and assisting Scioto and Lawrence Counties with coal supply chain impacts and brownfields redevelopment. The project will develop a region-wide Opportunity Zones strategy.

Funding Agency: National Institute of Justice
Amount: $714,199
Project Participants: Rachel Lovell, Dan Flannery, Xinyue Ye

Project summary: Using Sentiment Analysis and Topic Modeling in Assessing the Impact of Police "Signaling" on Investigative and Prosecutorial Outcomes in Sexual Assault Reports: The purpose of this study is to identify signaling in narratives of police officers' sexual assault reports that affect subsequent decision making, case flow, and attrition. Signaling, in this context, is defined as information conveyed by responding officers in the narratives of police reports regarding a victim's creditability and rape-myth adherence. We will examine police report narratives from sexual assaults using sentiment analysis and LLDA modeling to examine the presence and impact of a reporting officer's "signaling" for decision making, case flow, and attrition to better understand if and how reporting officers' description of the sexual assault impacts whether cases proceed or fail to proceed in the criminal justice process.

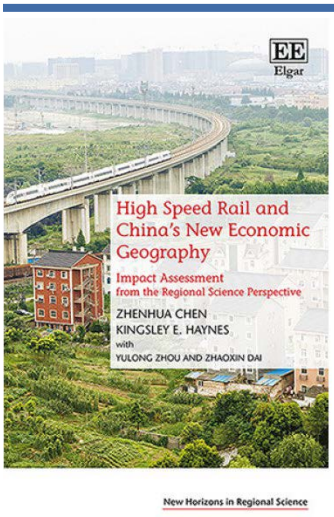
NARSC Members' Recent Books

Title: *Cities as Social and Spatial Networks*
Editors: Xinyue Ye, Xingjian Liu
Publisher: Springer



Description: This book reports on the latest, cutting-edge scholarship on integrating social network and spatial analyses in the built environment. It sheds light on conceptualization and Implementation of such integration, integration for intra-city level analysis, as well as integration for inter-city level analysis. It explores the use of new data sources concerning human and urban dynamics and provides a discussion of how social network and spatial analyses could be synthesized for a more nuanced understanding of the built environment. As such this book will be a valuable resource for scholars focusing on city-related networks in a number of 'urban' disciplines, including but not limited to urban geography, urban informatics, urban planning, urban sociology, and urban studies.

Title: *High Speed Rail and China's New Economic Geography: Impact Assessment from the Regional Science Perspective*
Editors: Zhenhua Chen and Kingsley E. Haynes with Yulong Zhou and Zhaoxin Dai
Publisher: *Edward Elgar Publishing,* Series: New Horizons in Regional Science

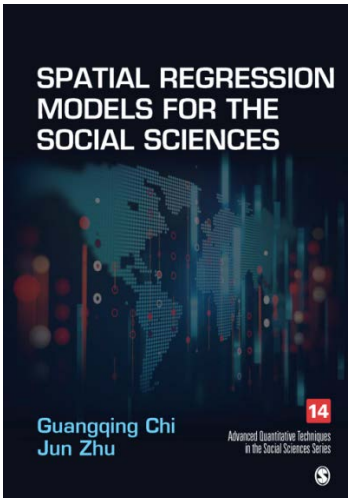


Description: High Speed Rail and China's New Economic Geography presents an analytical approach to assessing the socioeconomic impact of high speed rail in China, with an emphasis on capturing the spatial spillover effects of rail infrastructure development on China's economic geography in terms of land use, housing market, tourism, regional disparity, modal competition, the economy and environment. The assessment involves a multilevel spatial analysis approach at both the national and the regional level. The methods include partial equilibrium analysis characterized by a spatial econometric modeling and the state-of-the-art computable general equilibrium modeling. It provides a basis for policy decision-making and operational considerations.Academic scholars and students who are specialized in regional economics, urban planning, public policy, and transportation will find this book useful. Practitioners and policy-makers will also find this book valuable as the empirical findings provide implications for future transportation planning and development.

Title: *Spatial Regression Models for the Social Sciences*

Editors: Guangging Chi and Jun Zhu

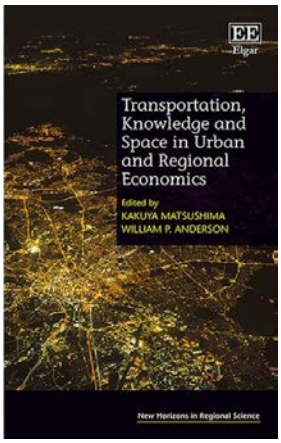
Publisher: *SAGE*



Description: This is a primer type of textbook for social scientists who would like a quick start to learning spatial regression methods. The past few decades have seen rapid development in spatial regression methods, which have been introduced in a great number of books and journal articles. However, when teaching spatial regression models and methods, the authors had difficulty recommending a suitable textbook for students in the social sciences to read. Many of the existing textbooks are either too technical for social scientists or are limited in scope, partly due to the rapid development in the methods. A textbook that provides relatively comprehensive coverage of spatial regression methods for social scientists and introduces the methods in an easy-to-follow approach is much needed. This book fills the gap and focuses on the methods that are commonly used by social scientists and tend to be useful to them. These methods include exploratory spatial data analysis, methods dealing with spatial dependence and/or spatial heterogeneity, and spatio-temporal regression models. The distinguishing features of the book include: comprehensive coverage of spatial regression models—from simple concepts and methods to advanced models—makes this book useful for a diverse audience including instructors, researchers, and students in a wide range of disciplines; the book's pedagogy includes study objectives, sidebars highlighting important points, figures/illustrations, and study questions for easy mastery of the material; supplemental materials including figures in color, data, and codes are available on github.com/srmss, which also hosts online discussions and new materials. This book could be particularly useful for social scientists who are familiar with standard regression methods and desire to learn spatial regression models and methods.

Title: *Transportation, Knowledge and Space in Urban and Regional Economics*

Editors: Kakuya Matsushima and William P. Anderson



Description: "This collection of 16 original research chapters by international scholars addresses the complementary roles of transportation and knowledge and their spatial manifestations in modern urban and regional economies. The authors provide research from North America, Europe and Asia. While the studies employ sophisticated methods and theory, there is a strong element of practical applications and policy implications in each chapter as well. This book will be of interest to communities of research and practice in urban and regional economics and planning, regional science and economic geography, transportation research, planning and management and the knowledge economy." --- Edward Elgar Publishing

Prottoy A. Akbar of the University of Pittsburgh to Receive the 19th Annual Benjamin H. Stevens Graduate Fellowship in Regional Science

Prottoy A. Akbar, a Ph.D. candidate in Economics at the University of Pittsburgh, has been selected as the winner of the Nineteenth Annual Benjamin H. Stevens Graduate Fellowship in Regional Science. The Fellowship will provide a 2019–2020 Academic Year stipend of $30,000 to support Mr. Akbar in his dissertation research entitled, "Public Transit Accessibility and Income Segregation."

The research will investigate how the scale and location of mass transit services within urban travel networks in the U.S. affect residential segregation and long-term accessibility gains by income. The results will be of interest to policymakers around the world as Mr. Akbar considers how improvements in urban transit would need to be distributed across space in order to minimize residential segregation or to maximize accessibility.

Mr. Akbar's doctoral research is supervised by Professor Randall Walsh, Professor of Economics at the University of Pittsburgh and a Research Associate with the National Bureau of Economic Research. In addition to selecting the Fellowship recipient, the Selection Committee identified three applicants as meriting special recognition as finalists in the 19th Annual Competition: Xiaodi Li, Ph.D. Student in New York University's Wagner Graduate School of Public Service, supervised by Ingrid Gould Ellen; Gary Lin, Ph.D. student in Applied Economics and Management, Cornell University, supervised by Nancy Chau and Ravi Kanbur; and Louis Sears, Ph.D. Student in Applied Economics and Management, Cornell University, supervised by C.-Y. Cynthia Lin Lawell.

The 19th competition winner and finalists will be recognized at the awards banquet luncheon of the upcoming November 13–16, 66th North American Meetings of the RSAI in Pittsburgh, Pennsylvania. The Fellowship is awarded in memory of Dr. Benjamin H. Stevens, an intellectual leader whose selfless devotion to graduate students as teacher, advisor, mentor, and friend continues to have a profound impact on the field of regional science. Fundraising efforts to increase the Fellowship's endowment are ongoing. Donations should be sent to: The Stevens Fellowship Fund, First Financial Bank, Attn. Trust Department, 1205 S. Neil Street, Champaign, IL 61820 USA. Checks should be drawn to The Stevens

Fellowship Fund. Donations may also be made by credit card through the NARSC website at www.narsc.org/newsite/donations2.php.

The 2019 Stevens Fellowship Selection Committee is composed of: Amanda Weinstein, Economics, The University of Akron (Chair); Daoqin Tong, Geographical Sciences and Urban Planning, Arizona State University; Mario Polèse, Urban and Regional Economics, Université du Québec; Elizabeth Mack, Geography, Michigan State University; and Nicholas Nagle, Geography, University of Tennessee. The Stevens Fellowship Committee administrates the Stevens Fellowship Fund on behalf of the North American Regional Science Council; its members are: Tony Smith, Chair; David Plane, Secretary; Michael Lahr, Treasurer; Janet Kohlhase; and Neil Reid, Executive Director of NARSC.

The Committee thanks the 19 students who entered the competition in 2019, as well as their dissertation supervisors. Faculty at all North American Ph.D. programs related to the interdisciplinary field of Regional Science are urged to encourage their best students to apply for the Twentieth Annual Stevens Graduate Regional Science Fellowship. The winning student's dissertation research in the field of Regional Science will be supported during the 2020–2021 year with a one-year stipend of $30,000. The application deadline is February 15, 2020. Full submission guidelines will be posted at http://www.narsc.org/newsite/awards-prizes/applications/

We remember Professor Norman Glickman

It was with great sadness that we learned of the death of Norman Glickman, Professor Glickman was a retired University Professor at Rutgers University's Edward J. Bloustein School of Planning and Public Policy. He passed away on Wednesday, May 8. He was 76. Please find his obituary here: https://bloustein.rutgers.edu/bloustein-school-mourns-passing-of-norman-glickman-retired-university-professor/.