

University of Groningen

Women in spatial economic analysis

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Published in:
Spatial Economic Analysis

DOI:
[10.1080/17421772.2021.1909892](https://doi.org/10.1080/17421772.2021.1909892)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2021

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Abreu, M., Poon, J., & Elhorst, P. (2021). Women in spatial economic analysis. *Spatial Economic Analysis*, 16(2), 241-246. <https://doi.org/10.1080/17421772.2021.1909892>

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To cite this article: Maria Abreu, Jessie Poon & Paul Elhorst (2021) Women in spatial economic analysis, *Spatial Economic Analysis*, 16:2, 241-246, DOI: [10.1080/17421772.2021.1909892](https://doi.org/10.1080/17421772.2021.1909892)

To link to this article: <https://doi.org/10.1080/17421772.2021.1909892>



Published online: 20 Apr 2021.



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EDITORIAL



Women in spatial economic analysis

Maria Abreu^a, Jessie Poon^b and Paul Elhorst ^c

ABSTRACT

This virtual special issue marks International Women's Day 2021 by drawing together 15 papers published in *Spatial Economic Analysis* over the past decade by female authors and co-authors. It highlights the wide range of ground-breaking research by these authors and their collaborators, growth of female-authored publications over time, as well as the geographical and career-stage diversity of female authors within the field. The papers include agenda-setting directions, novel applications of econometric and spatial analysis techniques, and spatial modelling applied to policy-relevant research topics.

KEYWORDS

International Women's Day, gender, agenda-setting research, econometric modelling, spatial analysis

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In this virtual special issue, we celebrate International Women's Day 2021 by drawing attention to the ground-breaking and substantive methodological contributions made by female authors and female research teams published in *Spatial Economic Analysis*. Excellence in academic scholarship has been accompanied by increased appreciation and support for gender (and racial) diversity in many university and research institutions, although there is still much work to be done. Our aim with this special issue is to highlight the slow but steady increase in gender diversity in the field, as well as the wide range of research topics and themes addressed by female authors since the launch of this journal in 2006. While the first few years saw a small representation of female scholars, a noticeable inflection point was reached in 2010. Since then, papers published by female authors have risen, and 2020 was underscored by a relatively higher number of submissions and publications by female authors or teams composed of female collaborators. In particular, the most recent two *Spatial Economic Analysis* lectures, highlighting new research agendas, were given by female scholars. Together, these lectures and the resulting publications mark an important milestone in the gender diversity of the journal's authors.

For the special issue, we selected 15 papers published in the past decade for their theoretical and/or methodological innovation. They showcase the range and depth of spatial economic research, as well as the agenda-setting scholarship of female researchers in the field, covering

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topics ranging from labour economics and migration to urban economics, spatial modelling, innovation, retail, health and education. On the 8 March 2021, International Women's Day, we highlighted the key contributions of the selected papers on the journal's new Twitter account (@spatialeconomic) and other social media outlets. The enormous amount of engagement and feedback on the day highlighted the long-term effects these papers had on scholarship in the field. Below we summarize the contributions of the papers included in this virtual special issue.

The role of migration is pivotal to the equilibria that emerge in spatial economic models, but it is treated in an ultra-simplified way in much of our theorizing. In the seminal book by Fujita et al. (1999, p. 62), for instance, migrants respond purely to the real wage differentials, producing dynamics that lead to one of several long-run equilibria. The idea is that migrants compare real wages in their home location with the weighted average of real wages across all locations. In reality, of course, real wage disparities are only part of the picture. In their analysis of migration flows within Poland, Sarra and Del Signore (2010) support the assumption that the key variable is indeed something akin to wages (their proxy of gross domestic product (GDP) per capita), controlling for unemployment rates, housing availability, road infrastructure and the incidence of crime. Their study was one of the first to provide evidence that economic factors are indeed prominent in explaining internal migration patterns, providing evidence to support discussions leading to the development of better specified models of the regional economy.

In our next paper, Autant-Bernard (2012) provides a pathbreaking review of the literature on spatial econometrics and innovation, and proposes a new research agenda for this important sub-field. The premise for this literature is that knowledge, once produced, spills over within and beyond spatial boundaries, but the nature, extent and scale of these spillovers vary considerably across spatial and time contexts. The author argues that these spillovers are best captured by the application of spatial econometric methods, which allow detailed consideration of the existence and range of knowledge spillovers. An important issue, as ever, is the W matrix, which defines just how knowledge is transmitted spatially across geographical units. Autant-Bernard provides a useful roadmap for modelling connectivity between units, for example, semantic proximity analysis 'may help us to define more precisely the characteristics of scientific communities and to study how knowledge diffuses through innovation networks' (p. 411). The paper covers a range of related ideas and methodological challenges, including dynamic nature of knowledge spillovers, and how these time effects could be incorporated into new and innovative models of knowledge networks.

Next, Chasco et al. (2012) analyse the location of production activity across regions, and in particular the relative importance of first- and second-nature mechanisms in explaining these location patterns. An important consideration is that while first-nature effects can be considered exogenous, second-nature effects are typically not. Moreover, both first- and second-nature effects may spillover across space, and the paper makes a significant contribution to the modelling of both exogenous and endogenous spatial dependence. The analysis in this paper confirms the significance of second-nature forces, in that 'second-nature forces clearly seem much more important for agglomeration than natural advantages. The net effect of agglomeration economies is more than seven times larger than the net effect of geography' (p. 260).

In the next paper, Mukim (2012) contributes to the empirical literature on the geography of innovation by specifying a novel regional knowledge production model to empirically identify the effects of research and development (R&D) expenditures, economic clustering and the distribution of human capital on innovation across districts in India. This study provides important insights into determinants of innovative activity for a large, emerging economy that has seen rapid economic growth in recent years. Moreover, the analysis is performed at the uniquely high spatial level of disaggregation, overcoming some of the shortcomings of using larger spatial units such as regions or states in modelling innovation processes. The results show that, in addition to R&D spending, the extent of agglomeration economies and the skills of local workers

can have a significant effect on innovation, as measured by patent activity. The estimates are robust to simultaneity bias, to different model specifications and to the personal characteristics of the inventor. Mukim highlights the important policy implications of the results. First, private, firm-level R&D has a positive effect on industrial innovation, but also spills over into patenting activity carried out by private individuals and research organizations. Second, education matters greatly in explaining local innovation outcomes. Finally, public policy may be limited in its ability to encourage innovation because agglomeration economies matter, and the capacity of policy to stimulate the latter may be relatively weak.

The paper by De Dominicis (2014) provides an interesting conceptual and empirical contribution to the debate on place-based versus people-centred policies. Drawing on a spatially augmented Solow model, the paper sets out to examine whether the clustering of economic activity in a relatively small number of locations can stimulate economic growth through the benefits associated with agglomeration economies. This is an important issue that speaks directly to contemporary policy discussions concerning the scale, coverage and nature of policy interventions. If interpersonal inequalities contribute positively to regional growth, then people-centred policies may not be sufficient, or even appropriate, instruments for enhancing regional potentials and addressing disparities at wider spatial scales, such as across regions or nationally. In turn, place-based approaches can be more effective by strengthening agglomerations and the benefits deriving from them, especially in the less developed areas of a country. The results of the paper provide very useful insights with regard to this important policy issue.

The role of human capital associated with skilled and creative workers spans more than two decades of work. The paper by Faggian and Franklin (2014), entitled 'Human capital redistribution in the USA: the migration of the college bound', departs from this body of work by highlighting human capital associated with individuals' transition from high school to college in the United States. Five hypotheses were tested and the results indicate that: (1) high human capital students are more inclined to move longer distances; (2) amenities are an important 'pull' factor for students, yet also differ from the literature by showing that this is less so for the best students; (3) students are fairly myopic and therefore weigh labour market circumstances less than, presumably, amenities; (4) educational variables, on the other hand, matter most, in particular for the top echelon; and (5) cultural avoidance plays less of a role, in particular for high human capital students. By analysing migration flows of college-bound students, Faggian and Franklin show that states in the East and Midwest attract high-quality students, while those in the South, Northwest and Appalachia attract low-quality students. They conclude that policymakers should focus on encouraging their best students to attend local institutions.

The paper by Le Gallo and Chasco (2015) is entitled 'Heterogeneity in perceptions of noise and air pollution: a spatial quantile approach on the city of Madrid'. The authors propose a flexible non-parametric approach to complex spatial interactions, avoiding the specification of a spatial weights matrix W and spatial lags when there is no theoretical basis for imposing such a spatial global parametric structure, as is the case in their hedonic model, which is estimated using a large database involving housing prices in Madrid. The paper is built around the conditionally parametric regression proposed by McMillen (2012), which is a locally weighted version of a non-parametric estimator that allows the coefficients of a base linear model to vary smoothly over space. The estimates obtained under their model reveal the considerable heterogeneity in the willingness to pay for less air and noise pollution across different parts of the city. Therefore, we see varying values and signs of the parameter estimates which are forthcoming from the analysis of house price quantiles, which highlight some hidden preferences on the part of homeowners.

The paper by Kopczewska (2016) uses the net present value (NPV) approach from the financial literature to model the efficiency of local public investments. Starting with a spatial panel of N units over T time periods, T models are estimated. The first model regresses the dependent

variable on the independent variables, all observed in the first period. The second model sums up the observations of the dependent and independent variables observed in the first and second periods, and then regresses this cumulative dependent variable on these cumulative independent variables. This goes on until eventually the dependent variable summed over all periods is regressed on the independent variables summed over all periods in the T -th equation. Such a static approach has the advantage that the time period before investments take any effect is accounted for. The point in time where the benefits of an investment exceed its costs can also be determined. The model, however, is more suitable for financial flow data. Kopczewska accounts for spatial interaction effects with other regions using stock data by estimating a spatial Durbin error model (SDEM). This spatial econometric model only produces local spatial spillover effects from one region to another if they are connected to each other, that is, if the corresponding element in the spatial weight matrix is non-zero. This model is more plausible within this context since spatial econometric models with endogenous spatial interaction effects will cause global spatial spillover effects. Finally, the paper compares the results with those of existing methodologies, including a dynamic spatial panel data model.

Suppose a country's population is spread across R residential regions and that this population makes use of health services spread across S locations. To what extent does one set of patterns influence the other? Mello-Sampayo (2016) develops a competing-destinations gravity model to answer this problem for the case of hospital choice among mental health patients in Texas. She highlights three factors in the state of Texas that influence flows of patients in mental illness: a rising clinical-forensic population, difficulties in managing external medical costs and the costs of renovating ageing infrastructure. These factors are modelled using a Poisson maximum likelihood (ML) estimator. The ML estimator is used instead of ordinary least squares (OLS) to deal with zero flows between several residential region-service region pairs. The results support previous findings in the literature on push and pull factors (such as the provision of clinical-forensic services and institutional quality) in patient location decisions, but in addition, the geographical interdependency of the two sets of location patterns also matters in explaining patient flows.

The paper by Öner (2017) sets out to determine whether consumer access to retail units in municipalities and/or wider regions in Sweden is relevant to the municipalities' attractiveness, where attractiveness is proxied by investment in housing in a municipality. It concludes that even though such a relationship is present for urban municipalities, this is not the case for rural ones. The paper contributes to the literature on retail geography by examining the role of consumption possibilities in enhancing place attractiveness, a relationship which is often neglected in debates on local development and growth. It convincingly argues that the function of the retail sector extends beyond a simple supply-and-demand schedule. Finally, it produces a new measure of accessibility to shops based on the ideas behind Tobin's Q .

The next paper by Grana and Eschelbach Hansen (2019) offers an interesting application of a mixed spatial econometric and social interaction model. The paper analyses bankruptcy spillovers using a dataset of all debtors who filed in the US state of Maryland from 1949 to 1973. Bankruptcy spillovers are defined at the household level as the decision to file for bankruptcy in relation to time lags and space-time lags of the bankruptcy of surrounding households. An alternative explanation suggested in the paper is that closer neighbours are more likely to share an attorney. In the empirical model, estimated using an innovative geocoded dataset, the authors find that time lags have a greater effect than space-time lags, and that the effects at the neighbourhood level exceed those at the county level. These results point to interpersonal exchange of information as the dominant mechanism of transmission since the alternative, stigma effects, would remain intact rather than die out.

The paper by Corrado et al. (2019) examines US adolescents' body weight-related behaviour (body mass index – BMI), and places an emphasis on understanding social and peer effects as well as past behaviour. But modelling social interactions is challenging because of endogeneity effects

(so-called ‘reflection’ problem). The authors offer a novel solution to overcome the reflection problem and identification (Manski, 1993) using a dynamic linear-in-means model; the difficulty of disentangling peer effects and contextual effects from each other (WY and WX), since only $K + 1$ of the $K + 2$ parameters are identified. Using the expected average rather than the observed behaviour of the individuals belonging to one group, the authors show that the reflection problem can be solved. Corrado et al. (2019) also set out how the parameters of their model can be estimated by generalized methods-of-moments (GMM). Their analysis supports social and peer effects as well as past behaviour for adolescents who become overweight, indicating that group-peer intervention may be relevant for policy.

In Franklin’s (2020) *Spatial Economic Analysis* Annual Lecture presented at the Regional Studies Association 2019 Annual Conference in Santiago de Compostela, Spain, the author raises the intriguing question: Is regional economic growth always beneficial? The question if growth should be the principal objective of regional development has preoccupied scholarship on US shrinking cities in recent years. This literature attempts to see population decline in a more positive light. Along the same lines, Franklin argues for a better understanding of ‘decline’ as a dynamic process since shrinking places are often paralleled by racial and ethnic diversity. In this sense, racial and ethnic diversity may enhance regional dynamism because new ethnic groups often refashion economic opportunities. She argues that inner-city population losses may be mitigated to some extent by new immigrant and ethnic groups. Moreover, she notes that shrinking cities are hosts to a more educated population over time.

The next paper by Morrissey (2020) is also based on an Annual Lecture plenary talk at the Cambridge Meetings of the Regional Science Association International – British and Irish Section in 2019. This thought-provoking paper highlights new knowledge that may be harnessed from big data, and the latter’s role in regional economic growth enriched with evidence from Great Britain. Data science has gained popularity as a field of study as social and digital media have exploded. Defined in terms of the three ‘V’s (volume, velocity, variety), big data presents the field of spatial economics with a source of data for urban and regional analytics. It has spawned new sectors of economic growth from geospatial technology to artificial intelligence. As Morrissey points out, big data opens new avenues for theorization and empirical investigation as it is expected to promote innovation and specialized skills in certain regions and enhance their absorptive capacity. But it is also likely to intensify uneven regional development. Her paper inspired the editorial board of *Spatial Economic Analysis* to look up all papers in the last four volumes whose analyses are based on relatively large microeconomic data sets. An overview of these papers can be found in the Editorial to issue 15(4) (Elhorst et al., 2020).

Individual location choices are driven by features that define the attractiveness of a neighbourhood, including the socioeconomic features of a given spatial unit. However, the relevance of those attributes is not limited to a given period: the consolidation of specific features of a neighbourhood in different periods affects individual preferences by factoring into the neighbourhood’s reputation. The latter often spans adjacent spatial units, creating local spatial dependence. In our final paper of this special issue, Epifani et al. (2020) model this spatial dependence explicitly while also controlling for both local and global heterogeneity in location decisions, using a Bayesian approach, and residential microdata over a substantial time period (1970–2010). This is a novel approach in that it adopts a conditionally autoregressive (CAR) rather than a spatial autoregressive (SAR) process, bridging the gap between the spatial demography and spatial econometric literatures, and suggesting future research directions. Their results also highlight the growing local spatial dependence levels over time (for their case study of Massachusetts), useful for other researchers working with residential microdata.

The virtual special issue can be accessed at: <https://think.taylorandfrancis.com/virtual-special-issue-for-international-womens-day-2021/>

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