Advanced methods and applications in regional science

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1 Introduction

The spatial distribution of economic activity is a central and general issue in regional economic theory and policy. Accordingly, methods and models play (and have played) an important role in understanding economic activity's spatial distribution. Agglomeration of firms in the same industrial sector gives rise to technological externalities by pointing to localisation economies. Externalities are also found, from knowledge spillovers within industries, and furthermore in agglomerations of firms belonging to different industries as a result from a variety of business services and knowledge spillovers across industries. How to understand and to analyse these economic processes depends upon the accessibility of appropriate quantitative methods.

All these germane topics called the attention of researchers that attended to the Third Jean Paelinck Seminar held in Cartagena (Spain) in 2008. In this meeting advanced methods and models with applications in regional science were presented. The papers of this special issue, entitled *Advanced Methods and Applications in Regional Science*, have its origin on this biannual international meeting.

The special issue therefore focuses on methods and applications with a direct and clear relevance in regional science's frontier of knowledge. For that reason, the reader can find two types of papers. First type are openly related with advanced methods that help in analysing some interesting regional topics as industry concentration in large

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study areas, spatial efficiency, market development among regions and the advances of spatial econometrics when there is microeconomic data in form of a panel. The second type of papers focuses on models and applications dealing with the role that inter-territorial spillovers represent in the location of industrial activity. Location is also studied from another perspective, as location can be influenced by communication externalities and interactions that appear in urban locations. Finally aggregated output is considered, particularly it is studied whether cross-region technological interdependencies (knowledge diffusion) can generate spatial externalities that may help in explaining regional output growth.

2 Advanced methods

Mur and Paelinck's paper tackles the non-trivial point of the weighting matrix W . Statistical inference of a spatial model is performed conditional on the presence of a given weighting matrix. The selection of W is an important decision which contrasts with the little formal available guidance to the choice of the 'correct' spatial weights for a given application. In general, sometimes W is exogenously specified only in function of the spatial layout (neighbourhood based criteria and different functions of distance), and sometimes weightings are endogenously obtained from the data. In this vein, the authors present and propose a simple approach to specify the weighting matrix by a 'complete correlation coefficient' approach.

H. Badinger and P. Egger, for example, make use of the weighting matrix when proposing a novel first order spatial autoregressive panel data model and its general moment parameter estimators, this model accounts for multidimensional error components. The contribution of this paper is also relevant, as generally spatial interdependence have typically assumed a one-way error-component structure. This new approach to model spatial interdependence is appropriate when micro level data is available.

The following three papers put forward new methods for different types of economic spatial concentration. Firstly, the paper by R. Kosfeld, H.-F. Eckey and J. Lauridsen aims to provide a new method that allows measuring industry concentration at a continuum of spatial scales. This approach, unlike standard NEG models, does not treat the whole industry uniformly, as it focuses on identifying sector-specific clusters and their impact on regional aspects. For regional policy, the geographical level at which clusters occur is of prominent interest as clusters on a small spatial scale are often primarily promoted by local governments and institutions. The application of these methods provides information on industry clustering and dispersion at all relevant spatial scales in Germany. As authors conclude, a first insight into co-location of subsectors within German industries is obtained.

Secondly, Pérez and Sanz's paper, in general terms, focuses on the transmission of price signals, which is based on the behaviour of fixing competitive prices in spatial terms and which it is an indicator of the degree of market integration among regions. This topic is studied for the agricultural sector and a different methodology is employed to separate random from systematic behaviour.

Finally, the paper by M.L. Maté and A. Madrid introduces a spatial index of productive efficiency for each productive unit in relation to its closed environment. Efficiency and location are important as some prior studies show that a great deal of efficiency variability can be explained by regional differences in labour and public infrastructure; agglomeration and interaction affect efficiency values; and location may influence a firm's innovation activities, with consequences on its production process and efficiency.

3 Advanced applications

The last three papers study the role of geographical location dynamics from models and its applications. An important characteristic of the economic development during the last few decades is a rapid expansion of the business- service sector. The paper by Johansson and Klaesson attempts to explain variation in growth within and between industries across geographic regions based on a model in which firms have random-choice preferences and respond non-linearly to time distances to customer markets. The paper considers geography at various levels of disaggregation, positing that firms in different types of industries (knowledge-intensive producer services firms, other producer services firms, and all other firms) will respond differently to market access measured at each level. The model is tested using data from Swedish urban areas. Consistent with the theory, the results suggest that local market access is a key driver of growth for producer services, and that the effect is indeed non-linear.

Industrial location is also the centre of interest in Alamá, Artal and Navarro's contribution to this issue. The paper deals with an interesting topic that has significant implications for municipal and regional development policy. The article focuses on the role of neighbourhood effects in the location choice of industrial entrepreneurs. Based on a sample of some 8000 industrial establishments, a spatial conditional logit model is used to identify the factors that can explain the choice of a municipality by entrepreneurs. The results show, as would be expected based on neoclassical economics, that human capital, agglomeration economies, and the availability of industrial land are the main factors driving entrepreneurs' preference for a municipality. Moreover, the analysis of the spatial component of the model shows that inter-municipal spillovers have a significant influence on the location decisions of the firms, thus confirming the need to account for such local dependence patterns when studying industrial companies' location choices.

Finally, knowledge externalities are taken into consideration in the paper by M. Fischer that provides an analytical framework to 'spatialize' the well-known Mankiw–Romer–Weil growth model by taking into account both within physical and human capital externalities and cross-region knowledge or technology spillovers. Moreover, by making use of the new developments in the spatial econometric literature, it is provided a cross-country growth regression specification to study empirically the spatial model. A main contribution of the paper is that it gives economic theory to spatial econometric practitioners interested in growth regressions.

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