Dynamic spatial microsimulation approaches to urban and regional systems modelling

Dimitris Ballas, Graham P Clarke and Danny Dorling

Centre for Computational Geography,
School of Geography,
University of Leeds
e-mail: d.ballas@geography.leeds.ac.uk

Abstract. It has long been argued that spatial microsimulation modelling frameworks can provide the enabling environment for powerful policy analysis. More specifically, in order to handle important "what-if" social and regional policy issues, there is a need for new dynamic micro-analytical frameworks. In this paper we present spatial microsimulation approaches to urban and regional systems modelling. In particular, we present a dynamic microsimulation model for the Irish rural economy aiming at estimating population microdata at the small area level and project these microdata into the future. This model first generates a spatially disaggregated population microdata set at the District Electoral Division (DED) level in Ireland for 1991. Further, the model uses data from the Irish vital statistics and other relevant sources and projects the 1991 microdata set into 1996. Comparisons are made between the model estimates and the 1996 Irish Census of population small area population statistics (SAPS), in order to validate the modelling exercise. The model is then refined accordingly and used to simulate dynamically the labour force of rural areas into 2001 and beyond, under different policy scenarios. Outputs of the model, which include the estimated life-paths of particular types of synthetic households and individuals, are presented. Moreover, the assumptions underpinning this dynamic microsimulation model are then refined and alternative modelling approaches are considered in order to provide the basis for a dynamic spatial microsimulation model for Britain with the scope of projecting the British population to 2021, under different scenarios. In particular, in the second part of this paper we introduce a new dynamic microsimulation framework which aims at combining data from the 1991 UK Census Samples of Anonymised Records (SARs), the UK 1991 Census Small Area Statistics (SAS) and the British Household Panel Survey (BHPS) in order to dynamically simulate urban and regional populations. In particular, we outline the aims and objectives of a dynamic spatial microsimulation model for the city of York (to be funded by the Joseph Rowntree Foundation), which will be based on this new framework to simulate dynamically the population of York under different policy scenarios. This model will be used as a pilot study for the spatial dynamic microsimulation of the entire British population. Finally, the difficulties in calibrating and validating dynamic microsimulation models are highlighted and ways to tackle them are explored.