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Title

Demographic Patterns in the City of Zagreb: Application of Advanced Spatial Statistical Methods

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Abstract

This paper explores demographic changes and migration patterns in Zagreb's city districts through the application of Exploratory Spatial Data Analysis (ESDA). By integrating spatial and demographic data from official sources like the Croatian Bureau of Statistics and EUROSTAT, the study highlights key trends such as population aging, migration, fertility, and housing patterns, with a focus on spatial inequalities between central and peripheral areas.

Advanced tools in the R programming language, including geographically weighted regression (GWR), global and local Moran's I, and Getis-Ord Gi*, are used to examine local demographic variations and map spatial trends. These methods reveal significant differences in demographic processes across the city, with central areas facing distinct challenges compared to the outskirts.

The research demonstrates the value of spatial analysis in urban planning, enabling a more detailed understanding of local demographic changes. The spatial tools used allow for precise mapping of key variables, revealing hidden patterns and relationships that traditional methods may overlook. By applying sophisticated spatial statistics, this paper provides insights into the spatial distribution of demographic variables, such as migration flows and fertility rates, and offers recommendations for targeted urban policy interventions. The use of R for data integration and analysis significantly enhances the capacity to inform spatial demographic planning and policy development in Zagreb, facilitating data-driven strategies for addressing the city's demographic challenges. The findings contribute to a deeper understanding of local dynamics and support more effective, tailored urban solutions.

Keywords

Spatial analysis, Demography, ESDA, R, Zagreb