

Interrelationships between Demographic and Socioeconomic Indicators of Regional Development in Russia

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ABSTRACT

This study integrates spatial, demographic, and socioeconomic data to reveal systemic interrelationships between demographic processes and the level of socioeconomic development in the constituent entities of the Russian Federation. The aim is to identify and quantify the links between demographic processes (fertility, mortality, life expectancy, net migration) and indicators of socioeconomic development in Russian regions over the period 1990–2025, as well as to construct a typology of regions based on the similarity of these interrelationships. Using matrices of pairwise correlation coefficients for 85 regions, obtained from observations of 59 key socioeconomic indicators from Rosstat for 1990–2025, and an original database of strong correlations ($r \geq 0.7$), we implement a two-level analytical design: (1) aggregation of mean correlation coefficients for each selected demographic indicator; and (2) cluster analysis of regional “correlation portraits” using k-means and hierarchical clustering algorithms. In addition, to substantiate the empirical results, we carry out a review of Russian and international literature on the influence of demographic processes on the economy, housing conditions, social infrastructure, and regional development. The analysis shows that life expectancy has the most robust positive associations with gross regional product (GRP) per capita and the cost of a fixed consumer basket, and negative associations with hospital bed availability and the share of the population with incomes below the subsistence minimum. In most regions, the total fertility rate is inversely related to the level of urbanization, housing provision, and credit burden. Population size and density are closely associated with the concentration of medical personnel and, at the same time, negatively correlated with total credit indebtedness and residential floor area per capita. Cluster analysis identifies four types of regions—synergistic, transitional, mixed, and contrasting—differing in both number and strength of correlation links. The patterns identified confirm the theories of agglomeration effects and demographic transition and underline the need for a differentiated regional policy that accounts for the specific features of socioeconomic development in the constituent entities of the Russian Federation.

Keywords: demographic processes; socioeconomic development of Russian regions; correlation analysis; cluster analysis; population size; total fertility rate; life expectancy; net migration; urban population share; population density

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