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Correlation Analysis of Socio-Economic Factors of Demographic Changes

Arseniy Sitkovskiy

*The Federal Research Sociological Center of the Russian Academy of Sciences, Russian Federation
Peoples' Friendship University of Russia, Russian Federation*

ABSTRACT

This study examines how a broad range of socio-economic factors influence key demographic outcomes across 85 Russian regions. We analyze regional time-series data (1990–2020) on over 70 indicators and demographic measures including total fertility rate (TFR, overall and by birth order), life expectancy at birth, migration inflows/outflows, and total population change. Pearson correlation coefficients were calculated for each region to identify robust associations, with lagged effects (1–3 years) considered to capture delayed impacts. To validate these relationships, Bayesian linear models were applied to the strongest correlations, providing probability distributions for effect sizes. The results show that fertility is most positively associated with social infrastructure supports for families – notably preschool availability and housing conditions – while higher poverty and unemployment correlate with lower birth rates. Life expectancy rises with improved healthcare provision (doctors, hospital beds) and living standards, and drops with poverty and joblessness. Net migration gains occur in economically prosperous, urbanized regions, whereas poorer regions with weak job markets experience population outflow. Migration has become the dominant component of regional population change, often outweighing natural increase. These findings underscore the multifaceted and region-specific nature of demographic change and suggest that targeted socio-economic policies are crucial for improving demographic outcomes.

Keywords: Bayesian correlation; fertility, mortality and migration; regional demography; Russian regions; socio-economic determinants.