

# New mathematical model to explain the correlation between migration and living standards

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Scientists from the Peoples' Friendship University of Russia (RUDN), Centre National de la Recherche Scientifique (France) and the University of Leicester (United Kingdom) have shown how the wealth of a country relates to its migration rates. A new mathematical model forms the basis for future research in this field. The study was published in *Nonlinear Analysis*. The results were presented at the VIII International Conference on Differential and Functional Differential Equations DFDE-2017 held on August 13-20 in the PFUR.

Scientists are making increasingly gloomy forecasts for the future because [world population](#) is growing uncontrollably and available resources are limited. In order to make more accurate predictions, they create mathematical models based on variables like birth rates, mortality, and the rates of migration from one region to another.

People move from place to place depending on economic, cultural and political factors. This movement is certainly more complicated than animal migration. However, animals migrate due to similar factors—richer resources and better quality of life in a new place. Therefore, scientists used mathematical approaches designed to describe the movement of animal populations as a starting point for modeling [population dynamics](#) between countries.

Researchers have analyzed how the distribution of wealth changes due to migration. Scientists understand wealth as the amount of material goods and services people consume in different countries and whether their needs are satisfied. Using a system of [partial differential equations](#), specialists have designed a [mathematical model](#) that describes migration both in random directions and in places where the greatest amount of resources necessary for well-being is

concentrated.

"It is well known that production and consumption of wealth depend on the population density, while birth and death rates depend on the welfare level," says Vitaly Volpert, one of the authors of the study. "The objectives of the study were not only to define the correlation between these processes, but also to find out the regularity of distribution of population and wealth in various conditions."

Modeling also accounted for [wealth](#) movement from developed countries to poor regions through trade, investment, production transfer from one country to another, and so on. This new model linking population dynamics and [wealth distribution](#) will boost future research in this field. "We expect mathematical models to help us face the challenges posed by migration in the global economy," Volpert concluded.

**More information:** V. Volpert et al, Interaction of human migration and wealth distribution, *Nonlinear Analysis* (2017). [DOI: 10.1016/j.na.2017.02.024](https://doi.org/10.1016/j.na.2017.02.024)

Provided by RUDN University

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