

Dynamics of Transformation from Segregation to Mixed Wealth Cities

Anand Sahasranaman and Henrik Jeldtoft Jensen

Department of Mathematics and Centre for Complexity Science, Imperial
College London, London, United Kingdom

Abstract

We model the dynamics of the Schelling model for agents described simply by a continuously distributed variable - wealth. Agents move to neighborhoods where their wealth is not lesser than that of some proportion of their neighbors, the threshold level. As in the case of the classic Schelling model where segregation obtains between two races, we find here that wealth-based segregation occurs and persists. However, introducing uncertainty into the decision to move - that is, with some probability, if agents are allowed to move even though the threshold level condition is contravened - we find that even for small proportions of such disallowed moves, the dynamics no longer yield segregation but instead sharply transition into a persistent mixed wealth distribution. We investigate the nature of this sharp transformation between segregated and mixed states, and find that it is because of a non-linear relationship between allowed moves and disallowed moves. For small increases in disallowed moves, there is a rapid corresponding increase in allowed moves, but this tapers off as the fraction of disallowed moves increase further and finally settles at a stable value, remaining invariant to any further increase in disallowed moves. It is the overall effect of the dynamics in the initial region (with small numbers of disallowed moves) that shifts the system away from a state of segregation rapidly to a mixed wealth state.

The contravention of the tolerance condition could be interpreted as public policy interventions like minimal levels of social housing or housing benefit transfers to poorer households. Our finding therefore suggests that it might require only very limited levels of such public intervention - just sufficient to enable a small fraction of disallowed moves, because the dynamics generated by such moves could spur the transformation from a segregated to mixed equilibrium.