

PROJECT SUMMARY

Understanding migration structure: a unified approach

Human migration patterns are routinely characterized using hydrologic analogies. Researchers commonly refer to migration streams and occasionally take note of currents, backwaters, and even eddies. To carry the analogy further, migration regions are suggestive of watersheds or catchment areas. The appeal of the analogy is the implied rational structure at the aggregate migration system level with guiding dynamics that are scale independent. Indeed, more than a century of migration research has revealed much about both the structures and the fundamental dynamics. Yet empirical analysis of migration systems has been limited by the availability of methodological approaches capable of identifying latent structures while retaining much of the complexity in the data. The fundamental conceptual elements of migration systems, cross-scale interactions and regionalization, are not adequately integrated into statistical models used to study interregional migration. A statistical framework is proposed, based on design matrix methods for generalized linear models, that provides a common mathematical basis for modeling migration, defining and evaluating migration regions, and visualizing migration regions and flows.

The research will have several broad impacts. At a basic level, an efficient means of identifying migration structure will increase understanding of interregional connectivity and the evolution of human settlement systems. As such, the research potentially informs basic policy issues related to environmental degradation, rural depopulation, suburbanization-exurbanization trends, urban poverty, health, and disease. At a more immediate level the research will inform process models of migration, model-based estimation, and population projections. The research plan includes several activities related to outreach and education.

The key element of the research is the recognition that migration subsystems and typologies, common constructs in migration regionalization, can be represented by GLMs using design matrix modifications and parameter restrictions. That recognition allows for parsimonious model specifications that capture the essential structural regularities in complex interregional flows. This in turn allows for greater disaggregation, more rationally structured migration regions, and computationally feasible model estimation. In effect, the framework imparts geography into essentially non-spatial categorical models.