

# Dynamics in the spatial structure of international migration flows between 195 countries, 1960-2010.

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## ABSTRACT

In the twenty-first century, the importance of international migration in shaping population distribution patterns, economic development and ethnic diversity will further increase. Despite its profound impacts, there is a lack of theoretical development tailored to the complexity of international migration, reflecting the dearth of adequate data. This paper aims to address this deficiency by determining the dynamics of the spatial structure of international migration and shifts in spatial patterns over the 50-year period, 1960 - 2010. Data are drawn from the WICiMig, a unique new data set that holds time-series estimates of five-year interval migration transitions between 195 countries for the period 1960-65 to 2005-10. The flow data were estimated by developing mathematical demographic techniques that link place of birth population stocks with migration flows. The basis for these estimates is the recently released global bilateral foreign-born stock data from the World Bank.

The analysis presented here is based on earlier work by Bell et al. (2002) and Rees et al. (2000), who argue that internal migration can be analysed along four dimensions: intensity, connectivity, impact and distance. We apply a set of indicators originally developed for the study of internal migration to international migration flow estimates to obtain a comprehensive picture of the spatial structure of flows between 195 countries. The results improve understanding of past global patterns of international migration flows and changes over time, with respect to the intensity, impact, connectivity and distance of migration. The findings facilitate the testing of contemporary theory, such as world systems theory, network theory and the theory of cumulative causation.

## EXTENDED ABSTRACT

In the twenty-first century, the importance of international migration in shaping population distribution patterns, economic development, labour market outcomes and ethnic diversity will increase even further. Considerable research has been devoted to the study of international migration, mainly in North America and Europe. However, the empirical findings presented in those studies are somewhat disjointed, mainly due to their interdisciplinary nature. Scholars in a variety of scientific disciplines, including geography, sociology, economics and demography, have all addressed particular aspects of international migration, offering different conceptual perspectives, including world systems theory, network theory and the theory of cumulative causation. Hence the literature on international migration is characterised by a range of conceptual approaches that have rarely been tested empirically, mainly due to a dearth of adequate data.

In the last decade, research has gathered momentum, whereby further improvement in data availability, statistical software and computer processing power has facilitated a more specific set of inquiries, focussing on particular issues. These include new forms of ethnic and cultural diversity (Fulcher 2000; Hirschman 2005), the brain drain (Beine, Docquier et al. 2001), student migration (Khoo, Hugo et al. 2011) and remittances (Adams Jr and Page 2005). Parallel to these detailed inquiries, the scope of research has broadened from concern for movements to and from single countries to flows between groups of countries (for example, EU-15). In Europe, increasing attention has been devoted to the harmonisation and estimation of international flow data (Raymer et al. 2011; de Beer et al. 2010). Despite the importance of international migration and recent progress in data and methods, there is surprisingly little systematic evidence about the intensity and spatial patterns of international migration and its impact on labour markets and population structures. Hence, there has not yet been a comprehensive study of the spatial structure of international migration at the global level.

This research aims to advance knowledge in this critical area by determining the spatial structure of international migration flows over a 50-year period. The results will facilitate theoretical development tailored to the complexity of international migration. The testing of contemporary theory, such as world systems theory, network theory and the theory of cumulative causation, require an understanding of past global patterns of international migration flows and changes over time. The findings will then allow the identification of stable international migration systems with a core receiving region and several sending countries (Fawcett 1989; Zlotnik, 1992). Understanding of the

dynamics of the spatial structure of international migration and of shifts in spatial patterns is also important for projecting future international migration flows and anticipating future changes in labour market outcomes, economic development and socio-cultural diversity.

Methodological concepts originally developed for the cross-national comparison of internal migration are applied to a unique new data set that links place of birth population stocks with migration flows (for a detailed description, see Abel, 2012). International migration flow data provided by national statistical offices are not comparable, since measures and definitions of migration differ between countries. Consequently, any inference about migration levels, directions, policy implications or the cause and consequences of people's movements at a cross national level is limited. Originally developed for the migration component in population projections, the migration flow data used here were estimated by, first, applying statistical missing data methods (see for example Little & Rubin, 2002) and, second, developing mathematical demographic techniques that link place of birth population stocks with migration flows (see for example Rogers & Raymer, 2005; Rogers & von Rabenau, 1971). The basis for these estimates is the recently released global bilateral migration data from the World Bank (Özden et al, 2011), which contains bilateral place of birth population stocks for the last five census rounds, 1960 - 2010. The data set holds time-series data on five-year migration transitions between 195 countries for the period 1960-65 to 2005-10, disaggregated by sex. Age-selectivity of migration is modelled using a standard 7-parameter Rogers curve (Rogers and Castro, 1981).

The analytical approach to establishing the dynamics of international migration is based on earlier work by Bell et al. (2002) and Rees et al. (2000), who propose that the complexities of the spatial structure of migration can be analysed along four main dimensions: intensity, connectivity, impact and distance. Seven measures are selected here that are relevant to international migration: (a) age-standardised migration probabilities (SMP) as a measure of the intensity of migration; (b) the coefficient of variation (CV) and principal flows as measures of migration connectivity; (c) aggregate net-migration probabilities (ANMP) and migration effectiveness indices (MEI) as measures of the impact of migration; and (d) mean distance moved and distance-decay parameters estimated using spatial interaction models as measures of the distance of migration. The results of the analysis of migration intensity and connectivity and its spatial impacts are visualised using bicomponent trend mapping.

The results provide a sound understanding of past changes in the spatial structure of international migration and thus facilitate the development of plausible assumptions about its likely future trajectory. Much of the current debate about the future trajectory of international migration in the context of climate change, human capital formation, and the role of education has been based on speculation. A main goal of this research is to provide a first step towards a fuller understanding of the dynamics of the spatial structure of international migration and of shifts in spatial patterns. The findings presented here will also facilitate the development of migration scenarios in global population projections as a basis for a better understanding of the likely future trajectory of international migration in a globalised world.

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