The Patterns and Trends in Global International Migration Flows Since the 1960s: A Revisit with New Data and Methods

Abstract for a paper to be presented at the European Population Conference, Budapest, 2014.

Nikola Sander[1], Phil Rees[2] and Guy Abel[1]

[1]Vienna Institute of Demography of the Austrian Academy of Sciences & Wittgenstein Centre for Demography and Global Human Capital, Wohllebengasse 12-14, 1040 Vienna, Austria

[2] School of Geography, University of Leeds, Leeds LS2 9JT, United Kingdom

SHORT ABSTRACT (max. 300 words)

In the absence of harmonised data on global international migration flows, estimates of net migration and bilateral migrant stock data published by the United Nations and the World Bank are used as proxy measures. A growing body of literature draws on these datasets to suggest a steady increase in the volume of global migration, a diversification of destinations, and a growing impact of migration on human settlement in recent decades. In this paper, we argue that net migration estimates and data on the number of people living outside their country of birth (i.e. migrant stock) do not adequately capture the complex spatial patterns and trends in global migration flows. We use new estimates of 10-year bilateral flows between 193 countries from 1960 through 2010 to calculate a set of indicators of migration spatial structure at global and regional levels. As laid out by Bell et al. (2002) for comparative studies of internal migration, we argue that the spatial structure of global migration flows can be decomposed into the intensity of migration, the degree of connectivity (or spatial focussing), the distance of migration, and the impact on the settlement pattern. We compare five indicators of spatial structure across world regions, across time, and between stocks and flows. Our results show that the increase in the volume of global migration flows is much lower than that of absolute net migration and migrant stocks. In fact, when related to the size of the global population, the volume of flows has been almost stable since the 1960s. We find that stock data tend to overestimate the intensity of migration in Europe relative to other regions and the impact of migration in the Americas. Our new visualisation method highlights contemporary trends in bilateral flows that are inadequately captured by stock data.

EXTENDED ABSTRACT

Introduction

At the global level, data on the stock of people living outside their country of birth are more reliable than data on the flow of people over a specific time interval. Besides the commonly cited estimates of net migration published biannually by the United Nations (UN), the bilateral migration stock matrices recently made available by the World Bank (WB) provide the most comprehensive source of harmonised global migration data. A growing body of literature draws on these stock data to analyse the patterns and trends of global migration (Czaika and de Haas 2013; C. Özden et al. 2011), gravity models of country-to-country migration (Ramos and Suriñach 2013), the migration-development nexus (Ç. Özden, Rapoport, and Schiff 2011), and the migration of labour (Walmsley, Winters, and Ahmed 2011). This list is not exhaustive, but serves to illustrate the point that migrant stock data are increasingly used in the literature to shed light on issue related to the global flow of people. However, as we show in this paper, data on the number of people living outside their country of birth have major weaknesses in capturing contemporary patterns and trends, and the economic and social processes that depend on them.

Flow data capture the number of people who change their country of residence over a fixed time interval, which is most commonly 10, 5 or 1 year. The volume of these flows and migrants' destination choices can change from one period to the next in reaction to changes in migrant policy, economic conditions or demographic pressures. Stock data, on the other hand, give the number of people whose country of birth differs from that of their current residence. The older the migrant, the less precise is the information on the timing of the move, which could have occurred at any time since birth. Hence, stock data capture not only contemporary migration flows, they also take into account migration flows that were voluminous a few decades ago but have since decreased in size. Migrant stocks thus capture the longer-term, cumulated net effect of flows on populations.

Net migration measures, estimated by the UN using demographic accounting, or by taking the difference between successive bilateral stock matrices (e.g. Beine, Docquier, and Özden 2011) are, according to Rogers (1990) a non-existent category of individuals that captures only the fraction of global flows that results in the redistribution of population. Since this share of the global flow changes over time, net migration measures, as we argue, provide a partial and inconclusive picture of global trends in migration intensities.

The dearth of comparable international migration flow data has hindered theoretical and methodological development. Moreover, as emphasised by King and Skeldon (2010), little progress has been made in integrating the two rather disjointed fields of studies on internal and international migration at the theoretical and empirical level. We demonstrate the fruitfulness of looking across the borders of the own discipline by borrowing and integrating a highly significant conceptual framework originally developed for the study of internal migration. In this paper, we revisit the major patterns and trends described in the literature concerning the globalisation and acceleration of migration using a new integrated approach and new data.

Data and Methods

We draw on comparable 10-year bilateral flows between 193 countries from 1960 through 2010 that are estimated from the UN (1990, 2000, and 2010) and WB (1960, 1970, 1980, 1990, and 2000) sequential stock tables. A detailed discussion of the estimation methodology can be found in Abel (2013) and Abel and Sander (forthcoming). These data capture the number of people who change their country of residence during a 10-year interval, similar to migrant transitions used in studies on internal migration that are captured by population censuses.

We apply our estimated flow tables to a set of indicators of spatial structure that we borrow from the literature on cross-national comparisons of internal migration patterns and trends. As laid out by Bell et al. (2002), the complex nature of migration patterns and trends can effectively be captured using indicators for four dimensions: intensity, connectivity, distance and impact. We show that several indicators originally developed for the study of internal migration can be readily applied to global international migration flow tables to provide new insights into patterns and trends. Specifically, we calculate five indicators. A detailed discussion of their calculation and interpretation is given by Bell et al. (2002)

1. Intensity

The *Crude Migration Intensity (CMI)* is calculated as $MP = \left(\frac{M}{PAR}\right) \times 100$, where the migrant count (M) in a given period is expressed as a percentage of the population at risk (PAR) at the beginning of the period.

2. Connectivity

The *Aggregate Coefficient of Variation (ACV)* is derived by first calculating separately the CV for immigration and emigration by taking the ratio of the standard deviation to the mean of observed migrant counts in the global origin-destination matrix:

$$CV = \frac{\sqrt{\left\{\sum_i \sum_{j \neq i} \left(M_{ij} - \overline{M}\right)^2 / n(n-1)\right\}}}{\overline{M}}$$

The country-specific CVs for immigration and emigration are then weighted by the country's share of global immigration and emigration respectively. The system-wide CV is then derived by summing all weighted in- and out-migration CV values.

3. Impact

The *Migration Effectiveness Index (MEI)* is calculated as the ratio of the sum of the absolute value of each country's net-migration balance to the sum of total movement between all 193 countries:

$$MEI = \frac{\sum_i |D_i - O_i|}{\sum_i (D_i + O_i)} \times 100$$

Where D_i is the total immigration to country i and O_i is the total emigration from country i.

The *Aggregate Net Migration Rate (ANMR)* is calculated as the ratio of the sum of the absolute value of each country's net-migration balance to the total population at risk and measures the spatial impact in terms of redistribution of population between regions:

$$ANMP = \frac{0.5 \times \sum_i |D_i - O_i|}{\sum_i PAR_i} \times 100$$

4. Distance

We calculate the median distance moved (MDM), which we standardise for region size by taking the aggregate distance between a region's countries.

We calculate our indicators at the global level and for a set of four world regions. Following the regional classification of the United Nations, we distinguish between Africa, Americas, Europe (excl. Russia) and Asia (incl. Russia, the Middle East and Oceania). We define partly overlapping regions to take into account not only the flows within each region, but also immigration flows from other regions and emigration flows to other regions. The left panel in Figure 1 shows that, based on our new estimates, flows within each of our four world regions represent less than 50 % of the total flow (with the exception of Asia). The right panel shows the same figures for the UN stock matrix in 2010. Stock data clearly overestimate the share of within-region movements, especially for the Americas and Europe.

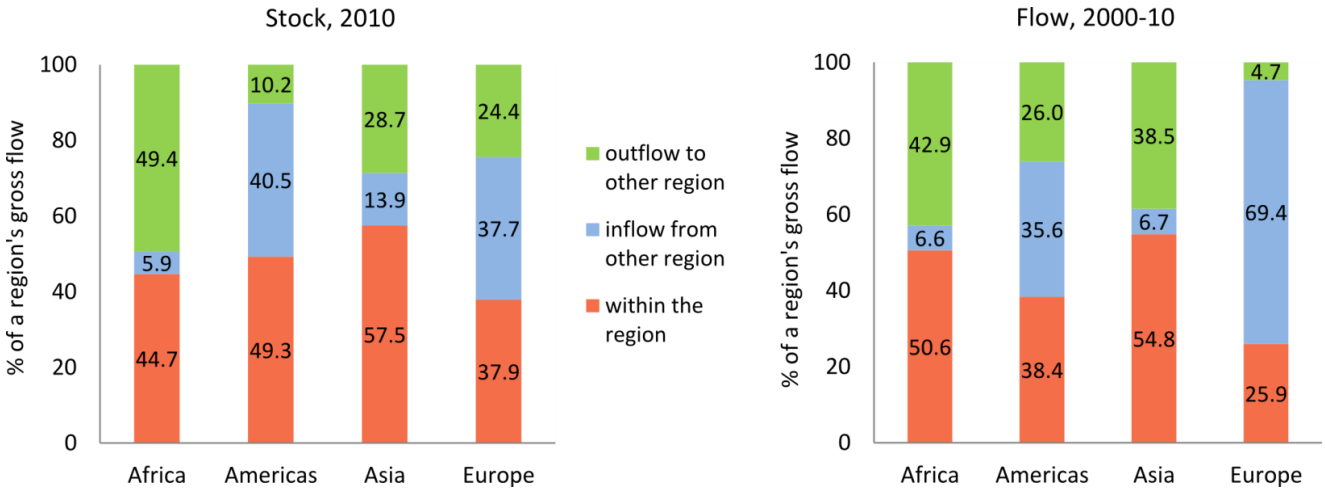

Figure 1. The percentage of each world region's gross flow that occurs within the region, compared to the percentage of outflows to other regions and inflows from other regions based on the UN stock data in 2010 (left) and our flow estimates for 2000-10 (right).

Results

Before turning to the indicators of spatial structure, we first briefly examine the notion of the acceleration of global migration flows. Comparing trends in the global volume of flows across a range of different data sources highlights the fallacies of using stock data or net migration as a proxy for migration flows (see Figure 2). We use the bilateral stock matrices for the years 1960 to 2000 published by the WB and supplement them

with the bilateral stock matrices for the same 193 countries for the years 1990 to 2010 published by the UN to create a 50-year time series. At the global level, differences between WB and UN stock tables are negligible. We calculate the absolute net migration based on differences in sequential stock tables.

Figure 2 compares the global migrant stock with the global number of absolute net migrants and our estimates of the global flow of people over 10-year periods. Not surprisingly, stock data and net numbers of migrants suggest a steady increase in the global volume of migration across the 50-year period. In contrast, the acceleration of 10-year migrant flows is less strong, especially in the last two periods. In relative terms, the decadal flow has been rather stable across time, whereas the migrant stock and the net number of migrants increased since the 1990s. As we will show in our analysis of migration intensity, impact and connectivity, the main reason for the divergence of trends between stock, flow and net migrants lies in an increasing efficiency of migration in redistributing the population. Consequently, the proportion of the total flow that results in population redistribution (i.e. the net migration) has increased over time. Most importantly, however, this increase has been paralleled by a decrease in the global migrant flow that does not result in population redistribution. Hence, the volume of the global flow of people has been stable since the 1960s at about 1.3 % of world population.

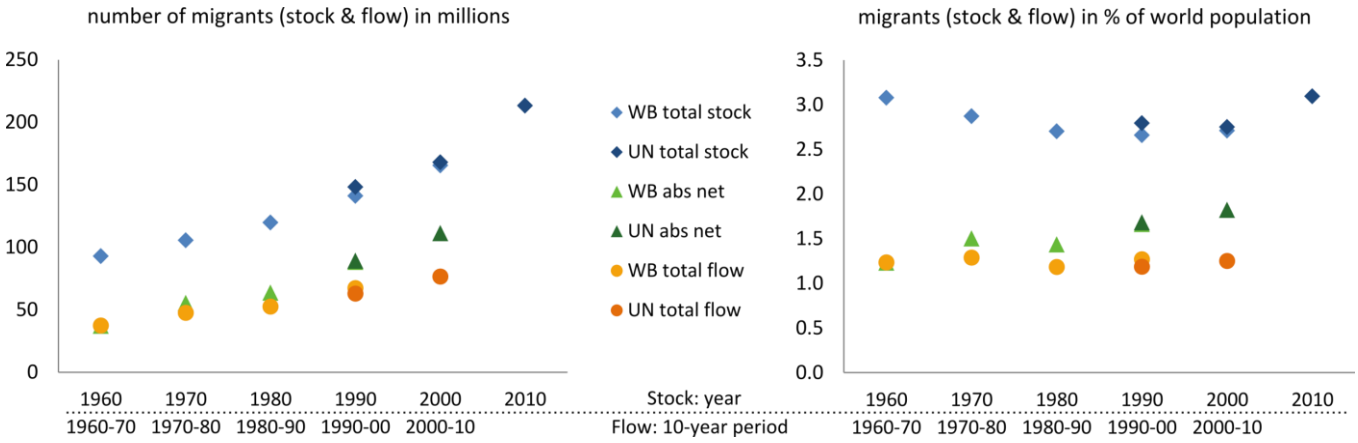

Figure 2. The intensity of global international migration since the 1960s for UN and WB stock data, absolute net migration calculated from successive UN and WB stock tables, and new estimates of 10-year flows. All totals are calculated across the same 193 countries.

Our evaluation of indicators of migration spatial structure reveals substantial differences in results between stock and flow data, which underlines the need for caution when migration flows over specific time intervals are proxied by migrant stocks or net migration. Our analysis of migrant flow data provides little evidence for international migration flow acceleration and globalisation, but highlights strong regional differences in patterns and trends that are not always visible when using stock data. Figures 3 summarises our results from the calculation of indicators based on the widely available stock data and compares the CMI (intensity), ACV (connectivity, spatial focussing), MEI (effectiveness of redistribution) and ANMR (effect on settlement pattern) across world regions and five time periods. Figure 4 shows the same indicators for our

new estimates of decadal migration flows. All indicators shown in Figures 3 and 4 are calculated using the same number of countries clustered within the same set of regions.

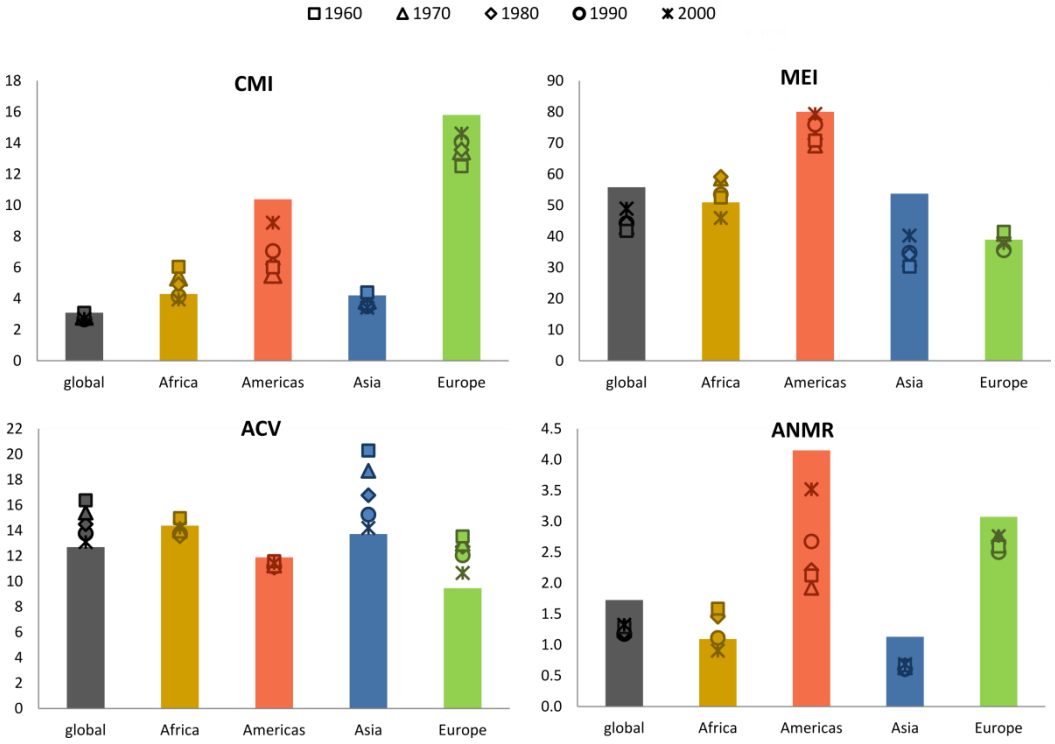

Figure 3. Four indicators of migration spatial structure at global and regional levels for six points in time, calculated from the UN and WB global bilateral **stock** tables. Bars indicate indicator values for the latest year 2010. Dots indicate indicator values for earlier points in time.

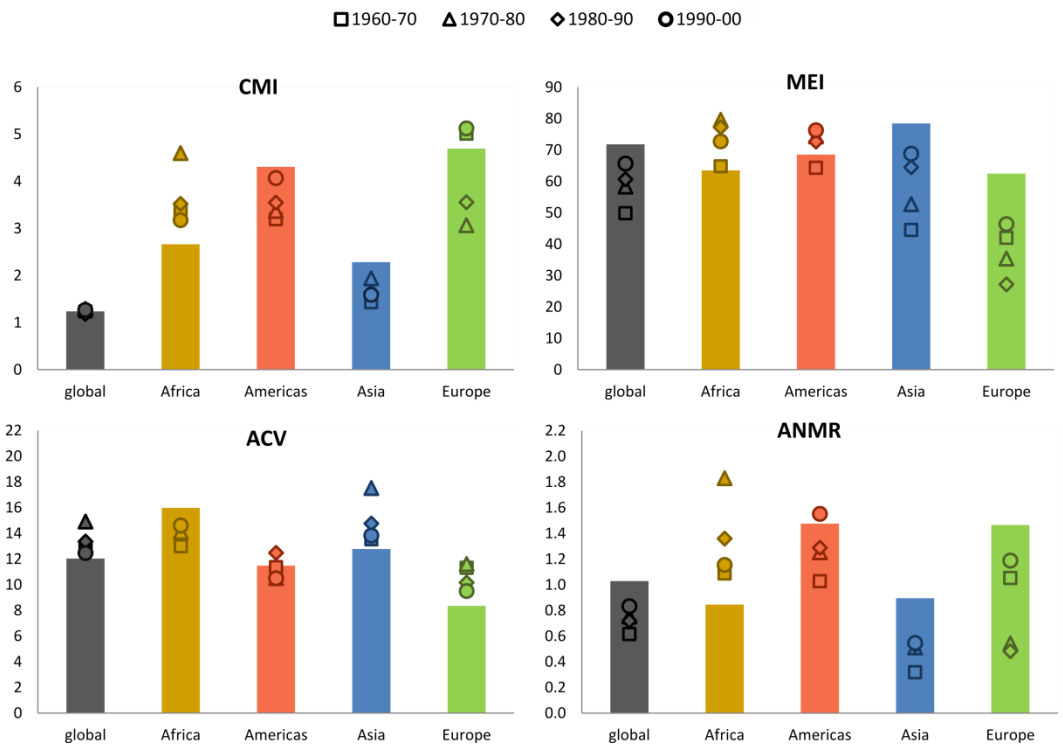

Figure 4. Four indicators of migration spatial structure at global and regional levels for five decadal time periods, calculated from our estimates of global bilateral migration **flows**. Bars indicate indicator values for the latest period 2000 to 2010. Dots indicate indicator values for earlier periods.

Figure 4 shows that the CMI has been stable at the global level at about 1.3 % of the global population moving over a ten-year period. The region-specific CMIs were calculated using total gross migration (immigration + emigration) in the numerator, which includes immigration from other regions and emigration to other regions. Hence, migrants may contribute to the CMI in the origin and the destination region, causing the region-specific CMIs to be higher than the global CMI.

Intensities of migration tend to be higher in the Americas and Europe compared to Africa and Asia, though intensities in Africa declined substantially since the 1970s. Comparing this pattern to the CMIs based on stock data (Figure 3) suggest the latter over-emphasise the intensity of migration in Europe compared to other regions.

The ACV as a measure of migration connectivity (or spatial focussing) exhibits less spatial variation and temporal fluctuation than the CMI. Across the 50-year time period, migration to, from and within Africa and Asia tended to be more focused than migration in the Americas and Europe. As noted by Bell et al. (2002), the ACV is less sensitive to the length of the interval over which migration is measured than other indicators, which is why our flow and stock data offer a similar picture of migration connectivity.

The MEI and ANMR as measures of migration impact show much more profound differences between stocks and flows. Figure 3 shows that when stock data are used, the MEI is much higher in the Americas than in the other three regions. The large stock of Mexican-born in the United States is likely to exaggerate the impact of contemporary migration. In contrast, the stock data suggest that the MEI of migration in Europe has been relatively low and stable over the entire period. When using flow data to calculate the MEI, the indicator increased over time at the global level, suggesting a rising effectiveness of migration flows in redistributing the population (Figure 4). At the regional level, the MEI decreased slightly over time in Africa and the Americas, while it increased in Asia and Europe. The increase in effectiveness in Asia and Europe may be due to the growing attractiveness of destinations in the Gulf region and the Mediterranean, which experienced high inflows but negligible outflows, leading to a very high impact of migration on populations. It is important to note that the effectiveness of migration is independent of the overall intensity. A high effectiveness simply indicates that a flow and counter-flow are very different in size.

A comparison of the ANMR in Figures 3 and 4 delivers a picture of differences between stocks and flows that is similar to that observed for the MEI. The effect of migration flows on populations is lower in Africa and Asia, and higher in the Americas and Europe, though changes across time are substantial. Despite these strong regional differences, the global pattern is clearly one of stable intensities, declining spatial focussing, and increasing impact of migration flows.

Differences in the indicators of spatial structure across regions and between stocks and flows become even more visible when we focus on country-level patterns. We present a unique and effective method for visualising migration flows that, as we argue, may transform the way we present migration flow data. Figures 5 to 8 show directional migration flows between the key sending and receiving countries in each of the four world regions in the period 2000-10. We show circular plots of migrant flows and migrant stocks side by side. Only flows between countries that send and receive at least 1.5 % of the region's total gross migrants are

shown. We also omit the smallest 25 % of country-to-country flows. The circular plots uncover several striking differences between the African, American, Asian and European regional migration systems.

The African system is characterised by three regional sub-systems of flows between countries in East Africa, West Africa and Southern Africa, and an open system of flows between Northern Africa and Southern Europe and the Gulf. In contrast, the American migration system is dominated by the flow from Mexico to the United States and the general attractiveness of the US as a migrant destination. The recent flow from Latin America to Southern Europe is clearly visible in our flow estimates, but not apparent in the plot using stock data.

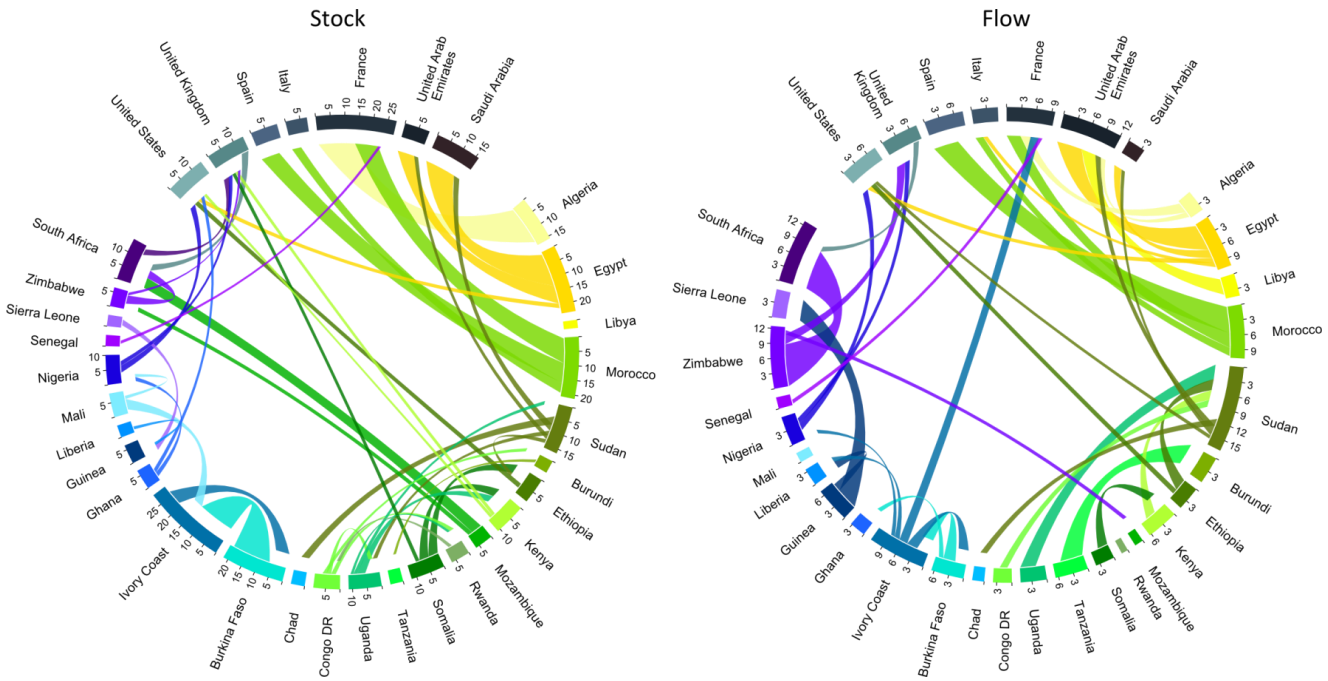

Figure 5. International migration flows between the top sending and receiving countries in the **African** migration system UN, comparing **flow** data for 2000-10 (left) and **stock** data for 2010 (right). Origins and destinations are represented by the circles segments. Each African country is assigned a colour. Flows to and from other world regions are coloured in grey and shown in the top half of the circle. Flows have the same colour as their origin and the width indicates their size. The direction of the flow is also shown by the gap between flow and region: the smaller gap denotes the origin; the larger gap denotes the destination. Only the largest 75% of all flows are shown. Tick marks show each country's gross migration in 100,000.

Migration flows between countries in Asia are characterised by a higher spatial focusing of flows combined with a high effectiveness of migration, which manifest itself in large outflows from India, China, Bangladesh, Pakistan and Afghanistan to neighbouring counties or to North America and the Gulf States. These large outflows have almost no counter flows, causing the effectiveness of these flows to be very high. Compared to the African migration system with its regional sub-systems, migration in Asia is characterised by substantial long distance movement through the centre of the circular plot. Comparing patterns of migration

flows and stocks in Asia shows that the stock data fail to capture contemporary trends of migration from India, China and Pakistan, while highlighting migrant populations in the countries of the Former Soviet Union.

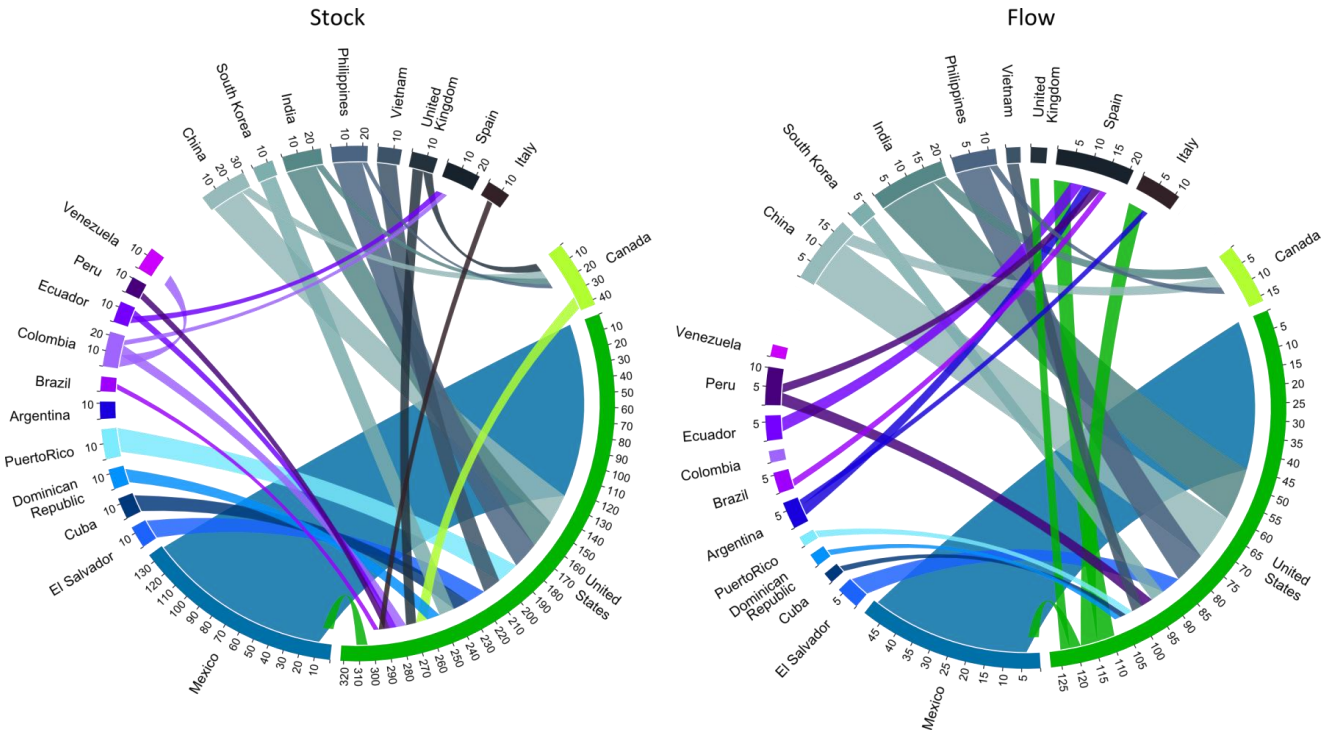

Figure 6. International migration flows between the top sending and receiving countries in the **American** migration system UN, comparing flow data for 2000-10 (left) and stock data for 2010 (right).

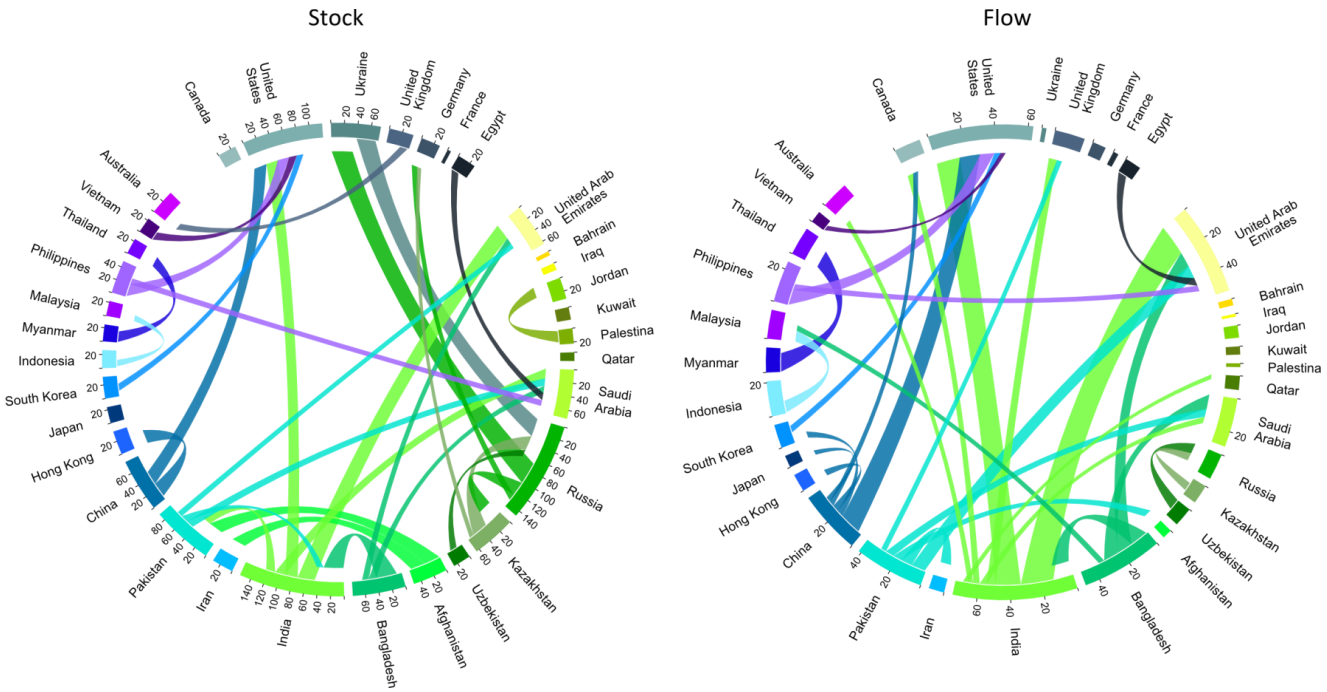

Figure 7. International migration flows between the top sending and receiving countries in the **Asian** migration system UN, comparing flow data for 2000-10 (left) and stock data for 2010 (right).

Of all four regional migration systems, it is the European one that shows the strongest connections with other world regions. The circular plot in Figure 8 is dominated by grey-shaded flows into Europe from countries in Africa, the Americas and Asia, whereas migration flows between European countries are limited to those between Switzerland, Germany, France, the UK, Spain, Italy and Serbia & Montenegro. This interconnectedness with other world regions cannot be captured if stock data are used. The latter do not adequately capture the attractiveness of Europe as a migrant destination.

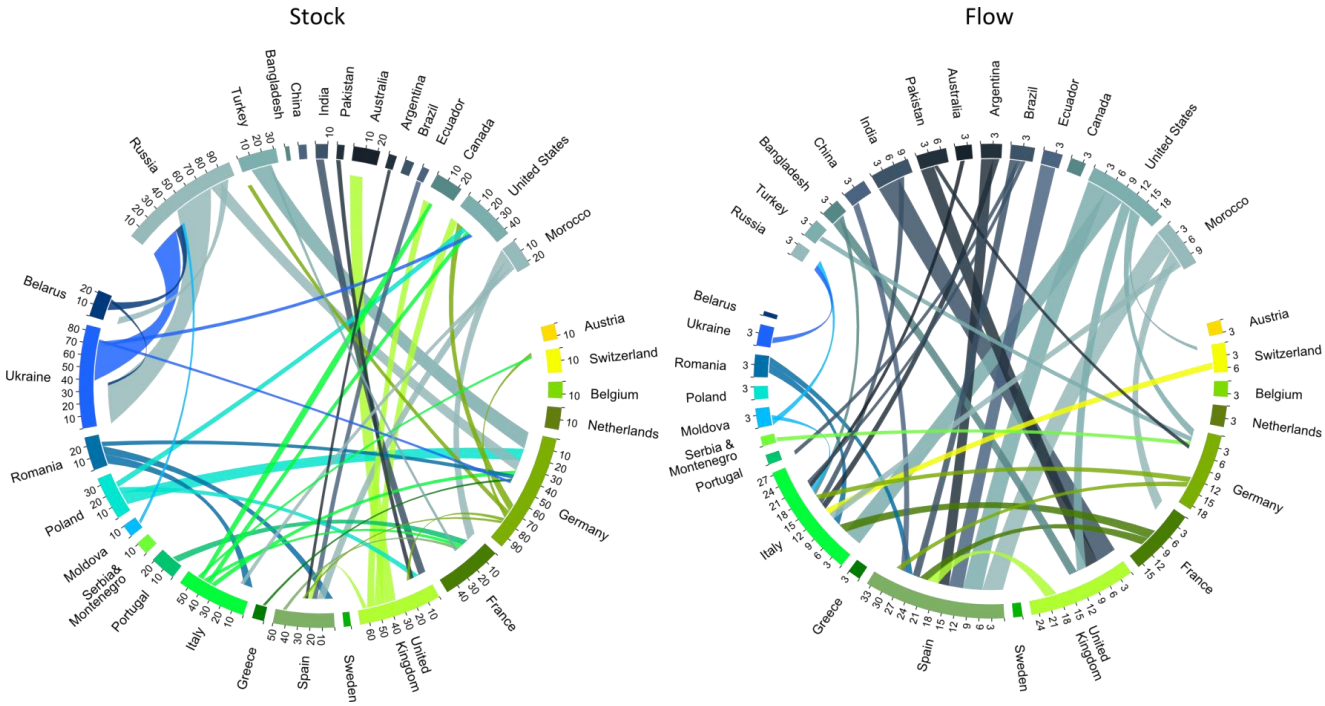

Figure 8. International migration flows between the top sending and receiving countries in the **European** migration system UN, comparing flow data for 2000-10 (left) and stock data for 2010 (right).

Conclusions

There is a growing body of literature that uses migration stock data to provide evidence for a globalisation and acceleration of global international migration flows. This paper has revisited these predispositions using new estimates of bilateral migration flows between 193 countries for five decadal time periods. We have analysed the patterns and trends of the global flow of people in an interdisciplinary setting and draw on methodological approaches originally developed for the study of internal migration. Our comparison of indicators of migration spatial structure across space and time has underlined the need for caution when using migrant stock data as a proxy for contemporary flows, since the two types of data exhibit quite different patterns and trends for most indicators we looked at. We have presented patterns of country-to-country flows using our newly developed circular migration plots, highlighting striking differences between migration flows in Africa, the Americas, Asia and Europe. In summary, we find some evidence that international migration has become more globalised and accelerated since the 1960s when using stock data. However, these data on migrant populations fail to adequately capture contemporary patterns and trends. Based on our

new estimates of global bilateral migration flows over 10-year periods, we find little evidence for a globalisation and acceleration trend.

References

Abel, Guy J. 2013. "Estimating Global Migration Flow Tables Using Place of Birth Data." *Demographic Research* 28: 505–546.

Abel, Guy J., and Nikola Sander. forthcoming. "Quantifying Global International Migration Flows." Manuscript in journal review.

Beine, Michel, Frédéric Docquier, and Çağlar Özden. 2011. "Diasporas." *Journal of Development Economics* 95 (1): 30–41.

Bell, M., M. Blake, P. Boyle, O. Duke-Williams, P. Rees, J. Stillwell, and Graeme J. Hugo. 2002. "Cross-national Comparison of Internal Migration: Issues and Measures." *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 165 (3): 435–464.

Czaika, Mathias, and Hein de Haas. 2013. "The Globalisation of Migration." *IMI Working Papers* (WP-68-2013). http://www.imi.ox.ac.uk/pdfs/imi-working-papers/wp-68-2013.

King, Russell, and Ronald Skeldon. 2010. "'Mind the Gap!' Integrating Approaches to Internal and International Migration." *Journal of Ethnic and Migration Studies* 36 (10): 1619–1646.

Özden, Caglar, Christopher R. Parsons, Maurice Schiff, and Terrie L. Walmsley. 2011. "Where on Earth Is Everybody? The Evolution of Global Bilateral Migration 1960–2000." *The World Bank Economic Review* 25 (1): 12–56.

Özden, Çağlar, Hillel Rapoport, and Maurice Schiff. 2011. "Five Questions on International Migration and Development." *The World Bank Economic Review* 25 (1) (January 1): 1–11.

Ramos, Raul, and Jordi Suriñach. 2013. "A Gravity Model of Migration Between ENC and EU". Institute for the Study of Labor (IZA). http://ftp.iza.org/dp7700.pdf.

Rogers, Andrei. 1990. "Requiem for the Net Migrant." *Geographical Analysis* 22 (4): 283–300.

Walmsley, Terrie L., Alan Winters, and Amer Ahmed. 2011. "The Impact of the Movement of Labour: Results from a Model of Bilateral Migration Flows." *Global Economy Journal* 11 (4) (January 27).