Internal Migration Across the City Hierarchy and Differentially Urbanized Regions in Developing Countries

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Abstract

The urban transition, defined by a population's increasing share living in urban areas over time, is among the most important transformation in contemporary population geography in the global South. Yet we know almost nothing about patterns of demographic change in cities. In this communication, we analyse domestic migration flows across a set of more than 1200 distinct functional urban areas and 500 differentially urbanized regions. Functional urban areas are defined consistently across time and space and englobe the entire urban population, thereby improving international comparison of inter-city migration in 41 developing countries spanning the entire urban transition. Migration trends and geographies are assessed from a cross-sectional perspective over the countries' stages reached in the urbanization process and confirmed based on a limited set of within-country trends. Results challenge the authoritative models of the urban transition – the hypotheses of a mobility transition and differential urbanisation. Inter-city migration increases swiftly in early stages of the urban transition, in parallel to the onset of rural-to-urban migration, rather than only in late stages when most of the population is already living in cities. The propensity to migrate diffused down the urban hierarchy over time, with large cities' playing a pioneering role in this process. We also found only timid indications for a levelling off in the rural exodus at advanced stages of urbanization. By contrast, the reverse flow from urban to rural areas declines over time, and migration between rural areas is limited. At the start of the urban transition, movements up the urban hierarchy dominate out-migration from the lower half of the ranked settlements, while downward flows are the norm in the upper half. Over time, however, increasingly higher ranked cities (except the largest ones) also experience a predominantly upward migration and migrants move over longer distances. Intermediate-sized and small cities constitute increasingly attractive destinations, relative to the primate cities. Yet this concerns migrants moving down the urban hierarchy to a larger extent than those moving upward.

Introduction

The urban transition – from a predominantly rural to a mainly urban society – is among the most important transformations in contemporary population geography with major implications for human development and the human footprint on the environment. Yet there is virtually no evidence on the demographic patterns underlying this population growth in cities. Due to the limited availability and poor quality of data, available studies usually focus on one single country and apply specific definitions and methodologies, thereby challenging international comparisons (Farrell 2018; Jiang et al. 2022; Lerch 2016). A number of multi-country studies have adopted dichotomous urban/rural classifications (Preston 1979; Chen, Valente, and Zlontnik 1998; Jiang and O'Neill 2018; Bocquier, Menashe-Oren, and Nie 2023) that do not provide information on the variability of demographic regimes across the hierarchical distribution of cities, as defined by population size or economic-political functions (thereafter referred to as the urban hierarchy). However, urban planning is mostly implemented at the city level. The UN compared migration patterns in a selection of major metropolitan areas but again relied on national definitions of their spatial extents (United Nations 1983), which differ significantly across countries and over time. We lack a truly comparative appraisal of demographic change across the whole spectrum of cities. In this communication, we analyze internal migration across the city hierarchy and the rural-urban continuum in 41 developing countries that span the entire urban transition.

The lack of comparative information on migration across the urban hierarchy is particularly surprising, given the preeminence of this demographic component in authoritative theoretical accounts of the urban transition (Lerch 2014). The hypotheses of a mobility transition (Zelinsky 1971; Skeldon 1997; DeHaas 2010) and differential urbanization (Geyer and Kontuly 1993; Champion 2001) propose a patterned spatio-temporal diffusion of the propensity to move in an urbanizing society, as observed in Europe over the 19th and 20th Centuries. Rural-to-urban migration is expected to increase in the take-off phase of national urbanization, economic development and demographic transition, and thereafter to decrease with further advancements in living standards in an essentially urban and late transitional society. This inverted U-shaped evolution in the propensity to move is expected to diffuse down the urban hierarchy, starting from rural areas close to central places towards peripheral regions of the country. In early stages of urbanization, migrants are predominantly attracted to the rising urban center (i.e. the primate city), where the pull factors of migration are sustained: higher income, more diversified labor markets and urban amenities. With further advances in development and its regional diffusion within countries, the development disparities between cities attenuate. At the same time, primate cities experience social and economic congestion effects resulting from the excessive agglomeration of human activity. Internal migrants are expected to be redirected towards lower-ranked cities, implying also flows down the urban hierarchy. When the society is predominantly urban, rural-to-urban migration becomes negligible and inter-city movements are expected to dominate population mobility.

Recent cross-sectional assessments in countries situated at different stages of urbanization tend to confirm this conjectured geography of migration (Rees et al. 2017; Charles-Edwards et al. 2017): in less urbanized countries, migrants have moved from less to more densely populated administrative areas, whereas at very advanced stages of urbanization (such as in Latin America; (Rodriguez-Vignoli 2017)), the direction of flows inverted. Densely populated places tend to experience negative migration balances. The insights from those studies of net-migration between subnational administrative regions may not reflect migration patterns across the urban hierarchy for two reasons. As cities usually comprise several administrative units, estimated migration flows include local within-city movements related to the processes of urban sprawl (i.e., from dense centers to the sparsely populated outskirts of a given urban agglomeration), rather than migration between cities and rural areas. Large and densely populated administrative areas, by contrast, may include a significant proportion of population living outside of a

given urban agglomeration. In this case, migration estimates would not account for a sizeable share of rural-to-urban migrations or the reverse flows. Moreover, the focus on net-migration can mask different combinations of directional flows and is therefore hard to interpret. It remains unclear whether the negative net-migration in densely populated areas is driven by higher out-migration as motivated by economic, social and environmental congestion effects in primate cities or because of lower attractiveness of those cities for rural-to-urban migrants, relative to alternative destinations is lower tiers of the urban hierarchy.

In this communication, we assess trends and geographies of out- and in-migration flows in more than 1200 urban agglomerations and 500 differentially urbanized regions in 41 developing countries that span all stages of the urban transition. We move beyond the classic rural-urban dichotomy by focusing on differences across the city hierarchy and the rural-urban continuum, which are defined accurately and consistently across space and time (based on remote sensing data) to ensure international comparison. In doing so, we extend the scope of previous work that included only a limited number of countries (Lerch 2020). As more than half of the world population since 2017 is concentrated in cities and future increments are expected to be concentrated there (United Nations 2018), a differential look at their demographic fate is timely, not least to unravel for the first time in the literature international regularities in inter-city migration over the urban transition.

Data and methods

To test the above hypotheses, we estimated out- and in-migration of distinct urban agglomerations and differentially urbanized regions, relate these intensities to the places' relative ranking within the national urban hierarchy, and investigate how this associations changes as national levels of urbanization rise. Given the limited availability and quality of official statistics on migration across cities in developing countries, we rely on available individual-level data and aggregate them at the level of urban agglomerations and differentially urbanized regions.

Migration data come from the URBDEMO collection of Integrated Public Use Microdata Samples (IPUMS) of population and housing censuses fielded between 1970 and 2017 (Minnesota Population Center 2022), which is maintained by the Urban Demography Lab at the Ecole Polytechnique Fédérale de Lausanne (EPFL). The URBDEMO collection is a multi-year collection of 85 census rounds that covers 41 developing countries (see Map 1), representing X% of the total population in less developed regions of the world. To define migration, we used transition data, comparing the detailed information on the individuals' current and (self-declared) former administrative places of residence. In 52 census rounds, the former place of residence refers to five-year intervals prior to the enumeration date. For the 24 country-years in which the information refers to the exact year of the last move, we derived comparable five-year migration transitions. In the remaining nine censuses of the URBDEMO collection, only one-year interval migration data are available. We simply multiply the estimated migration rates by five to ensure comparison in the sample (a more elaborated method of translation of 1-year or last-migration data into 5-year transitions will be developed for the final version of this communication).

Map 1: URBDEMO collection of countries (in gray) and functional urban areas (FUAs, in red), 41 developing countries (spatial extent of FUAs as of 2015).
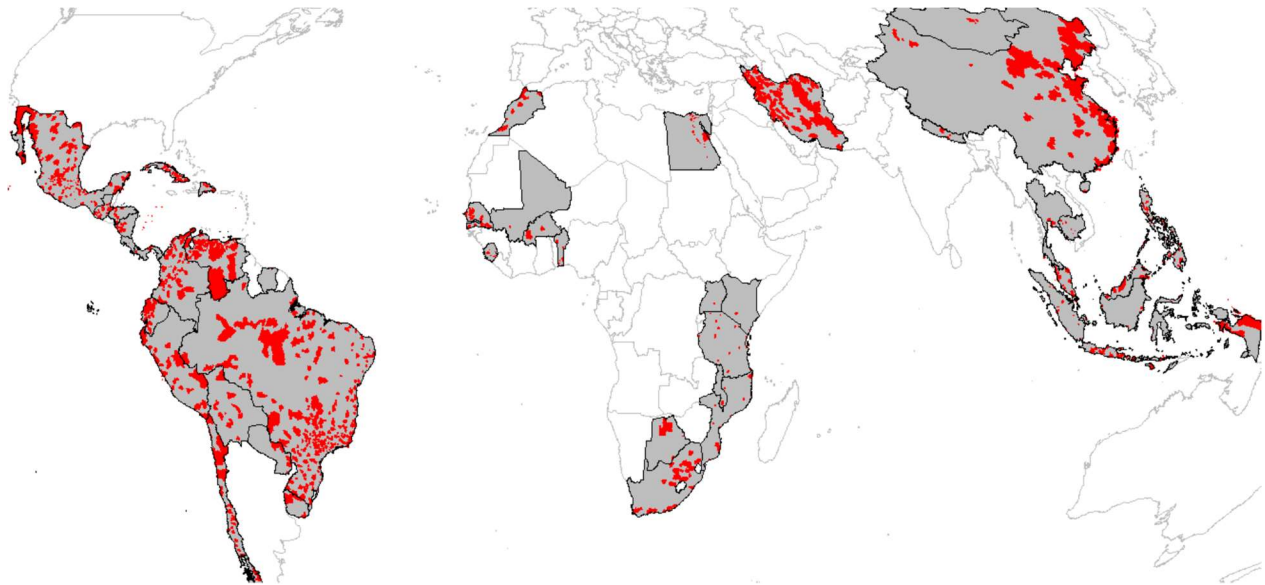
Sources: URBDEMO collection of IPUMS, OECD 2020.

The URBDEMO collection relies on an independent harmonization of geographies and residence variables over a restricted set of census rounds (in each country) that provide information on current and previous residence at administrative levels. Detailed administrative geographies are indeed key to accurately aggregate the census respondents at the agglomeration level and estimate migration flows across the urban hierarchy.

This was ensured by spatially matching the administrative geographies of the censuses to the location and spatial extent of each urban agglomeration or functional urban area (FUA). FUAs were defined by the European Commission (EC) using an internationally consistent methodology based on the Global Human Settlement Layer (GHSL) of resident population at 1km x 1km grid resolution of the earth, as estimated using remote sensing data on population and housing units (OECD/European Commission 2020)[1]. An FUA is composed of at least 50 thousand residents spread over a densely populated urban center (e.g., a cluster of adjacent 1km x 1km grids with at least 1'500 inhabitants) and its adjacent commuting areas. We assigned a census administrative unit to a given FUA if at least one half of its inhabited area an/or resident population (as assessed based on the Global Human Settlement Layer) is spatially intersecting with the FUA.

Relying on this definition of FUAs adapted to administrative geographies, the URBDEMO collection distinguishes 1208 distinct FUAs (out of a the 3385 identified in total by the EC in our sample of countries; see Map 1). Small FUAs to which any administrative census unit could be successfully matched, as well as cities with less than 50 thousand inhabitants (for which the spatial extent is not provided by the EC), cannot be identified in the censuses. We therefore categorize the rural-urban continuum of the remaining national territories by regrouping adjacent administrative units that fall into the same country-

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[1] The EC produced these small-area population estimates by redistributing the population counts disaggregated by administrative areas across 1km x 1km spatial grids of the earth in pro-rata of the density of built-up areas, as spotted from satellite images (including information on the spatial extent, the type and height of buildings).

specific tertiles of the distribution according to the level of urbanization as of GHSL (OECD/European Commission 2020).

We aggregated the enumerated population by FUAs and the remaining differentially urbanized regions as of their 2015 borders. Holding constant this urban geography backward in time is crucial for improving our estimates of migration (by avoiding confounding effects related to the reclassification of rural into urban areas over time), for enabling a robust assessment of temporal trends, and ensuring the observation of the full extent of each agglomeration population.

The URBDEMO collection of IPUMS, enriched by this urban perspective, is used to estimate country- and period-specific matrixes of migration across urban agglomerations and differentially urbanized regions. Individuals with various types of missing information about their former place of residence (i.e., completely missing, missing only at the lowest administrative level, unknown year of last move) were redistributed in pro-rata of the respective known distributions. We then derived descriptive indicators of the migration system.

We define the urban hierarchy in each country by a hierarchical classification of the four settlement types: FUAs and the remaining clusters of highly, intermediate or low urbanized administrative units. Within each of those hierarchal groups, we further rank settlements by decreasing population size. We use a relative (or normalized) measure of the urban hierarchy to ensure international comparison across countries characterized by different population sizes and various numbers of distinguishable settlements: the rank of each settlement is divided by the total number of distinct places within a given country. Values close to zero indicate top tiers within the urban hierarchy, while values equal to unity refer to the bottom of the hierarchical distribution of settlements.

We exploit the international diversity of the URBDEMO collection in terms of urbanization levels to analyze how migration changes over the different stages of the urban transition. Migration trends are investigated across country-year-specific estimates, which are aligned according to the increasing percent of the national population living in urban areas as an index for the process time of the transition. Moreover, seven countries in the URBEMO collection are observed over two successive censuses, seven countries offer three time points, and one country provide four census rounds. Thus, migration trends observed from a cross-sectional perspective of cities in our 41 countries can be confirmed by the analysis of within-country trends over up to four decades. While the sample of countries that have not yet reached the threshold of 60% of population living in cities covers all developing regions (as defined by the UN), the remaining observations come exclusively from Latin America and the Caribbean (LAC), which is far more urbanized than Asia and Africa.

Preliminary results

Figure 1 reunifies all estimated crude rates of three types of internal migration flows aggregated at the country-level: rural-to-urban (from less- and intermediate-urbanized regions to FUAs/more urbanized regions), urban-to-rural (the reverse flow), inter-city migration (between FUAs/highly urbanized regions), and movements between rural (less- and intermediate-urbanized) areas. The average trends of migration over the urban transition are predicted from linear regression model including a polynomial spline function of the national percentage urban.

The results tend to confirm an inverted U-shaped trend in rural-to-urban migration as countries urbanize. However, the peak levels in out-migration from rural areas are reached rather late in the urbanization process (when about 75% of the population already lives in cities). The subsequent decline in migration is also timid, indicating a continued drain of the rural populations in many highly urbanized societies.

The average rate of migration in the reverse (urban-to-rural) direction is not significantly different from to the rural exodus in early stages of the urban transition. As the transitions progresses, however, the level declines almost linearly. The over-representation of sub-Saharan countries among our observations at early stages of urbanization certainly plays a role. There, a high urban-to-rural migration is frequently associated to return movements of previous rural-to-urban migrants, especially in periods of economic crises (Beauchemin 2011; Potts 2013). In later stages of urbanization (and development), however, movements seem to become more permanent, leading to lower urban-to-rural flows.

Figure 1: Crude rate of rural-to-urban, urban-to-rural and inter-city migration according to the national levels of urbanization, 41 developing countries, 1970-2017.
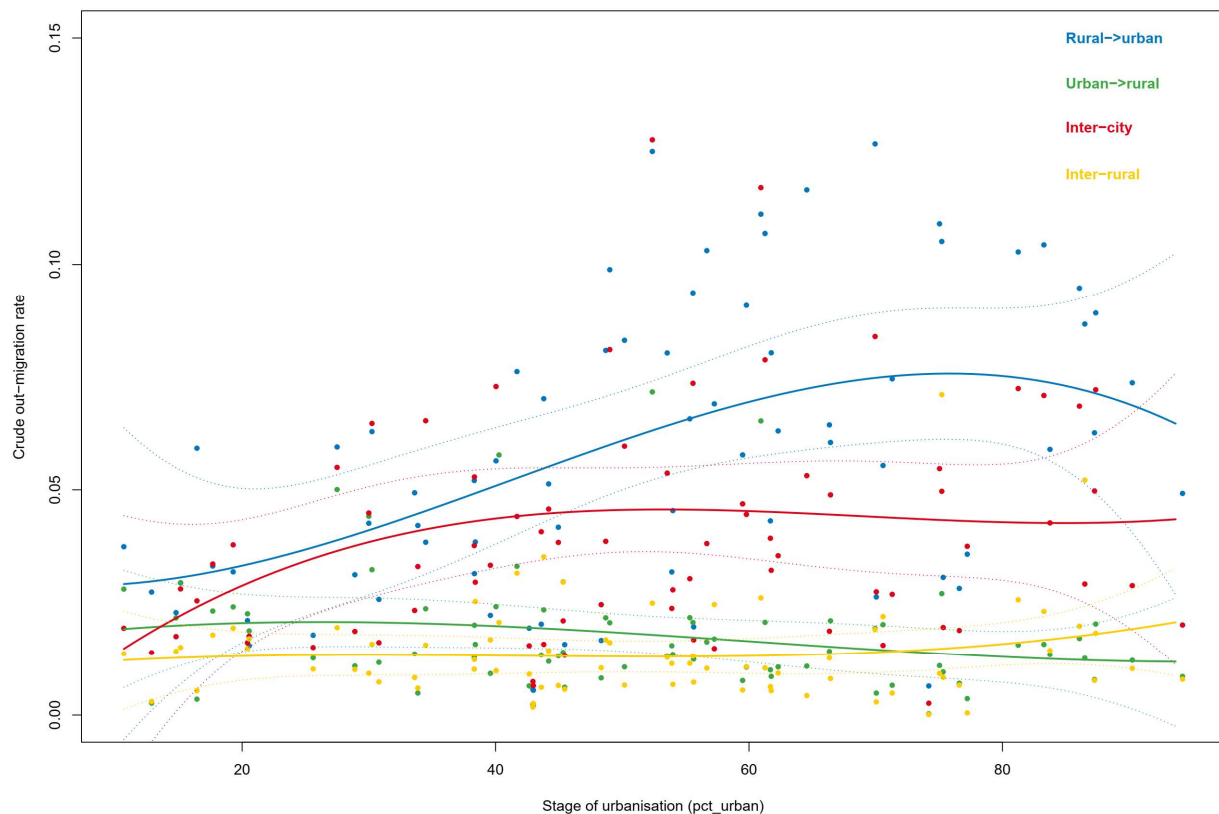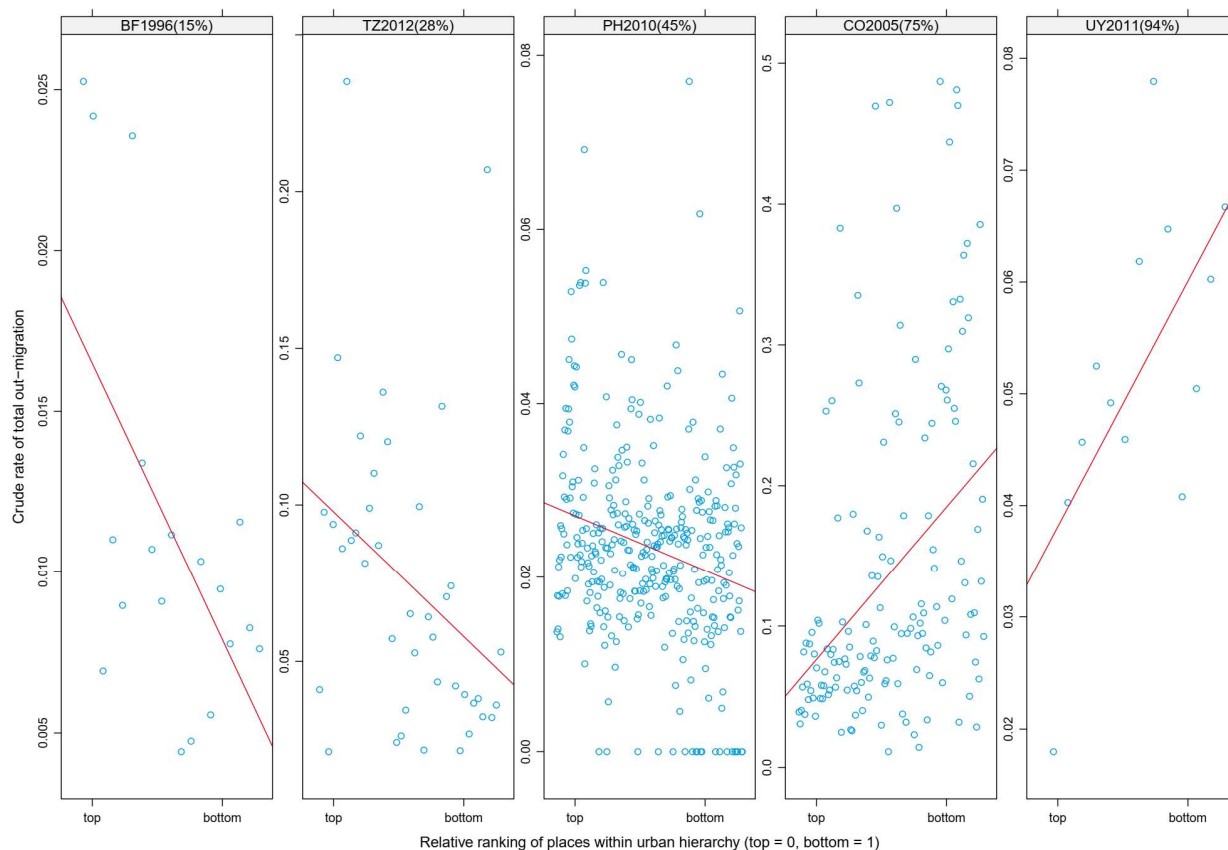

Sources: URBDEMO collection of IPUMS data. Note: country-years with 1-year migration data are excluded.

It is interesting to note that migration between FUAs or other highly urbanized regions rises earlier than expected over the course of the urban transition. In countries characterized by an urbanization level of 30%, the intensities of inter-city and rural-to-urban migration are almost at par. With increasing levels of urbanization, inter-city migration rates remain stable, while rural-to-urban flows continue to increase (before starting to decrease timidly in highly urbanized countries). Thus, migration between cities play a crucial role from the beginning of the urbanization process, rather than only in later stages when the urban hierarchy has matured and the pool of potential migrants from rural areas is shrinking – as conjectured by the mobility transition hypothesis.

The intensity of migration between rural areas, by contrast, is the lowest and remains rather stable over time, with only a slightly increasing tendency in very late stages of urbanization.

To better understand how migration opportunities diffuse across the urban hierarchy over time, Figure 2 shows the relationship between total out-migration from distinct FUAs or differentially urbanized regions and their relative ranking within the settlement hierarchy in five countries that span all stages of the urban transition – ranging from Burkina Faso (15% urban in 1996) to Chile (86% urban in 2017). Lower values on the horizontal x-axis indicate settlement positions at the top of the hierarchy, while higher values correspond to the bottom of the hierarchy. There is significant variability in the intensity of migration among places situated at similar levels of the urban hierarchy. Nevertheless, in early stages of urbanization the out-migration rates tend to be higher at the top of the settlement hierarchy when compared to its bottom. This confirms the crucial role of cities in the diffusion of migratory behaviors at the onset of the urban transition.

Figure 2: Crude rate of total out-migration according to the FUA/urbanized regions' ranking within the urban hierarchy, selected countries at different stages of urbanization, 1970-2017.
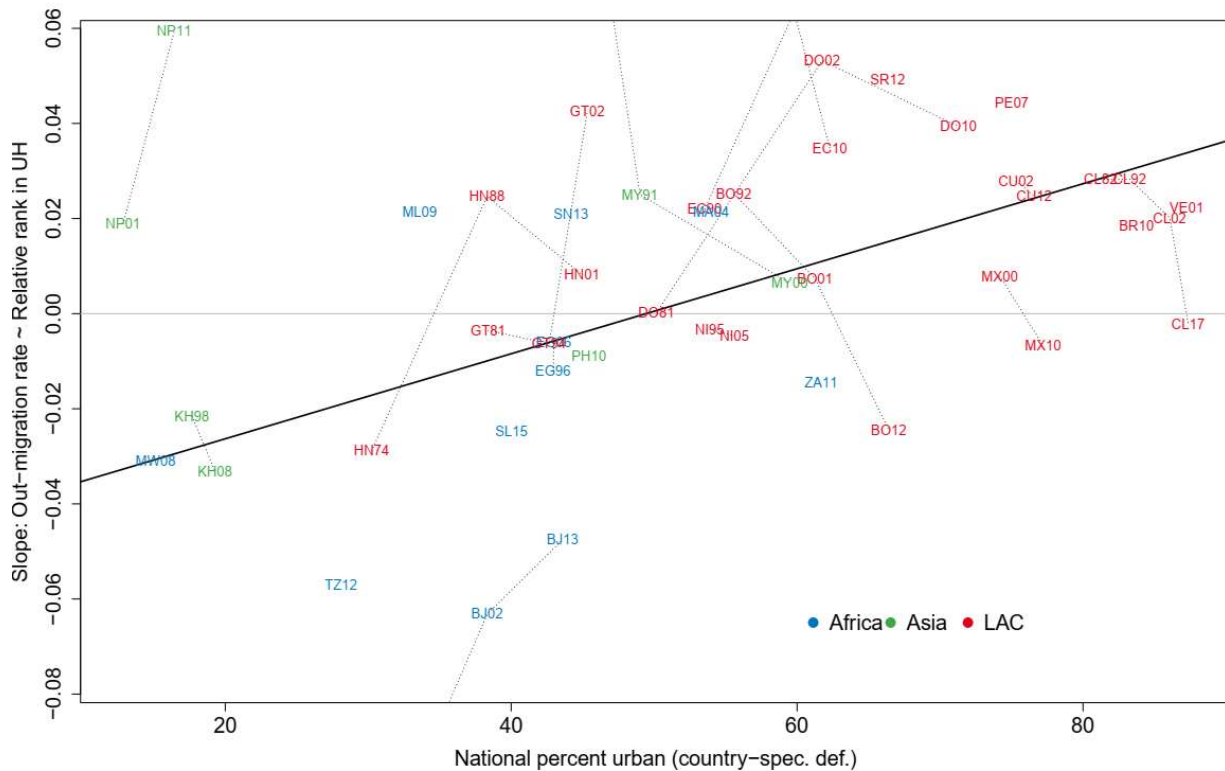

Sources: URBDEMO collection of IPUMS data. Notes: country names corresponding to the iso2 codes can be found in the Appendix; the national percentage urban is given next to the country iso2 code and census year.

The strength of this negative association progressively vanishes over the first half of the urbanization process. After half of the population is already living in cities, the relationship turns positive, as demonstrated in Colombia 2005 and Chile 2017: the rates of out-migration are higher at the bottom than

at the top of the urban hierarchy, indicating a large-scale rural exodus. This changing relationship between out-migration and the settlements' positioning within the urban hierarchy is confirmed in our full sample of country-years. Figure 3 illustrates the evolution over the stages of urbanization in the estimated slopes from country-year-specific regressions of the out-migration rates on the origin places' relative ranking. The linearly fitted line across all these regression coefficients clearly shows that migratory behaviors diffuse from the top tiers of the urban hierarchy to the bottom. This is confirmed by within-country trends (see the dotted lines connecting point observations), although we also observe similar out-migration rates from all tiers of the urban hierarchy in some highly urbanized countries such as Chile and Mexico, as well as in Bolivia (where the most recent regression coefficients hoover around zero).

Figure 3: Country-year specific regression coefficients of the tiers within the urban hierarchy on the intensity of out-migration, 41 developing countries aligned according to the level of urbanization 1970-2017.
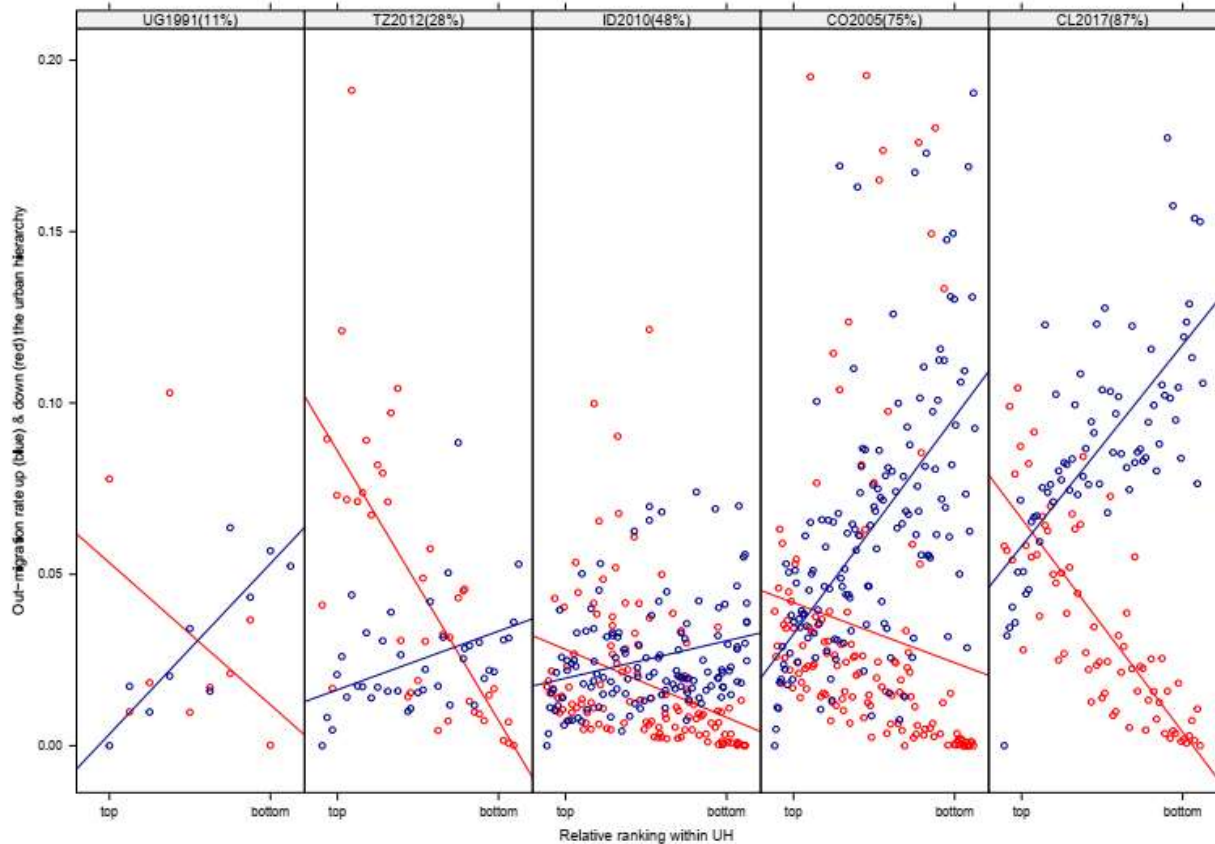

Sources: URBDEMO collection of IPUMS data. Notes: each observation is indexed by the iso2 country code and the census year; a regression slope < 0 (on vertical y-axis) means higher out-migration rates from top tiers of the urban hierarchy, while slopes > 0 indicate higher rates from the bottom; country names corresponding to the iso2 codes can be found in the Appendix.

Next, we are interested in the relative importance of out-migration flows up and down the urban hierarchy. Figure 4 plots the place-specific rates of out-migration up (in blue color) and down (in red) according to the relative ranking of settlements within the urban hierarchy of five countries than span the entire urban transition. In Uganda in 1991 (when only 11% of the population was urban), upward movements clearly dominated at the bottom of the urban hierarchy, while downward flows are more

important from the top of the urban hierarchy. This general pattern is also observed in countries that reached higher levels of urbanization. However, the crossing-points between the fitted lines predicting upward and downward migration rates across the urban hierarchy is moving towards the top tiers of the hierarchy as the urban transition progresses. In Uganda 1991, the upward movements dominated out-migration in origin places situated in the lower half of the urban hierarchy, while downward migration was more important in the upper half of the ranking. In Chile, by contrast, the majority of cities (80%) experience more upward than downward movements. Downward flows dominate only in the top 20% of the ranked settlements.

Figure 4: Crude rate of upward (in blue) and downward (in red) out-migration across the urban hierarchy in five selected developing countries, 1991-2017.

Sources: URBDEMO collection of IPUMS data. Note: country names corresponding to the iso2 codes can be found in the Appendix.

In Figure 5, we plot these crossing points (e.g., the relative hierarchical position of settlements at which the dominant upward movements start to be substituted by mainly downward movements) estimated for all country-years and aligned according to the stage reached in the urbanization process. The trend across country-years is summarized by a fitted regression line from a model including a cubic spline function of the national percentage urban. This truly international appraisal confirms that migration increasingly redistributes population from the lower tiers to the top tiers of the settlement hierarchy as the urban transition progresses. This is also evident from country-specific trends (see the dotted lines connecting point observations). Thus, attractive forces in the primate cities appear to increase over time, rather than decrease as conjectured by the hypothesis of a mobility transition.

9

Figure 5: Relative hierarchical rankings (within the urban hierarchy) at which the predominantly upward migration flows start to be substituted by mainly downward movements, 41 developing countries aligned according to the national percentage urban, 1970-2017.
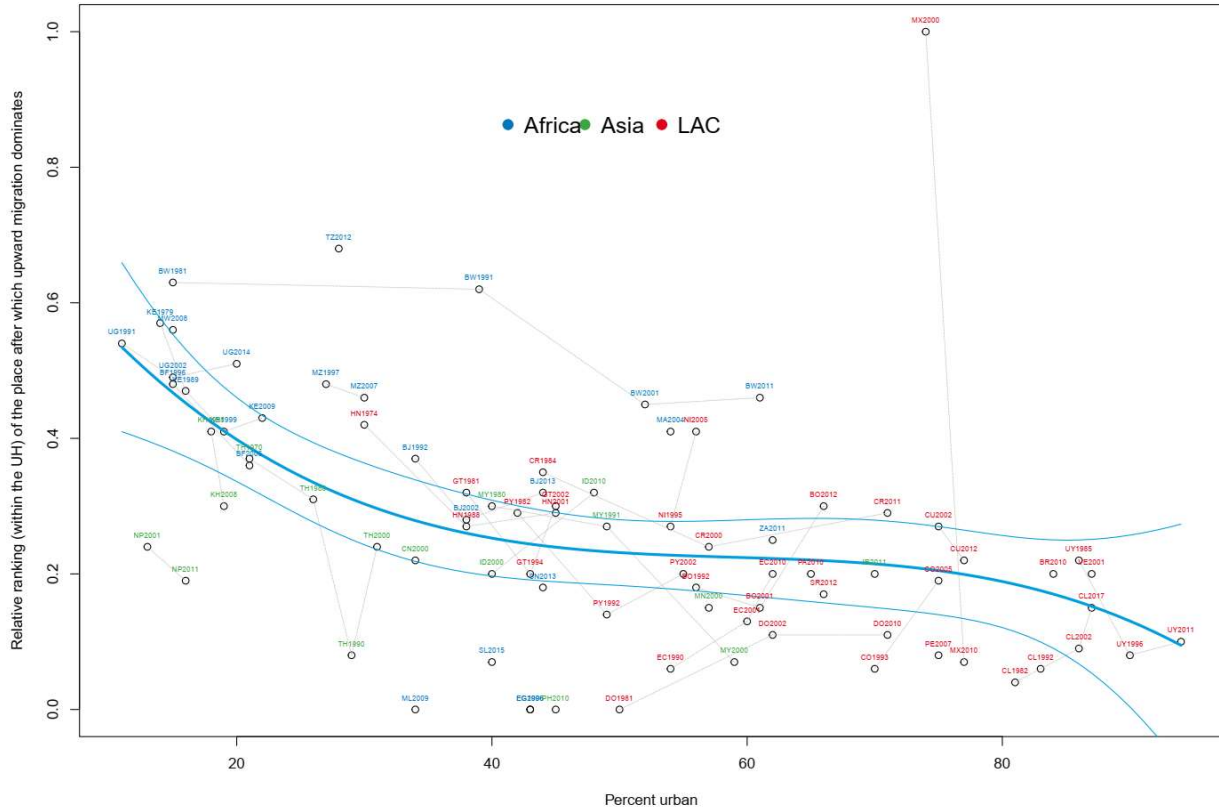
Sources: URBDEMO collection of IPUMS data. Note: country names corresponding to the iso2 codes can be found in the Appendix. Notes: the vertical y-axis indicates the relative ranking of settlements at which the country-year-specific fitted lines of upward and downward migration according to the hierarchical positioning of settlements cross each other (e.g., the x-axis coordinates of the country-specific crossing points in Figure 5 are shown).

To further assess the attractiveness of different tiers of the urban hierarchy over the course of the urban transition, we analyzed the changes in the associations between in-migration rates and the relative ranking of destination places. Similar to Figure 3 focusing on out-migration, Figure 6 shows the coefficients from country-year-specific linear models that regress the levels of in-migration on the destinations' relative ranking within the urban hierarchy. In early stages of urbanization, in-migration is highest in the largest FUAs and lowest at the bottom of the hierarchy. This confirms a strong initial focus of migrants on primate cities.

Figure 6: Relationship between intensity of total in-migration and the tiers of the urban hierachy (regression coefficients) over the stages of urbanization, 41 developing countries 1970-2017.
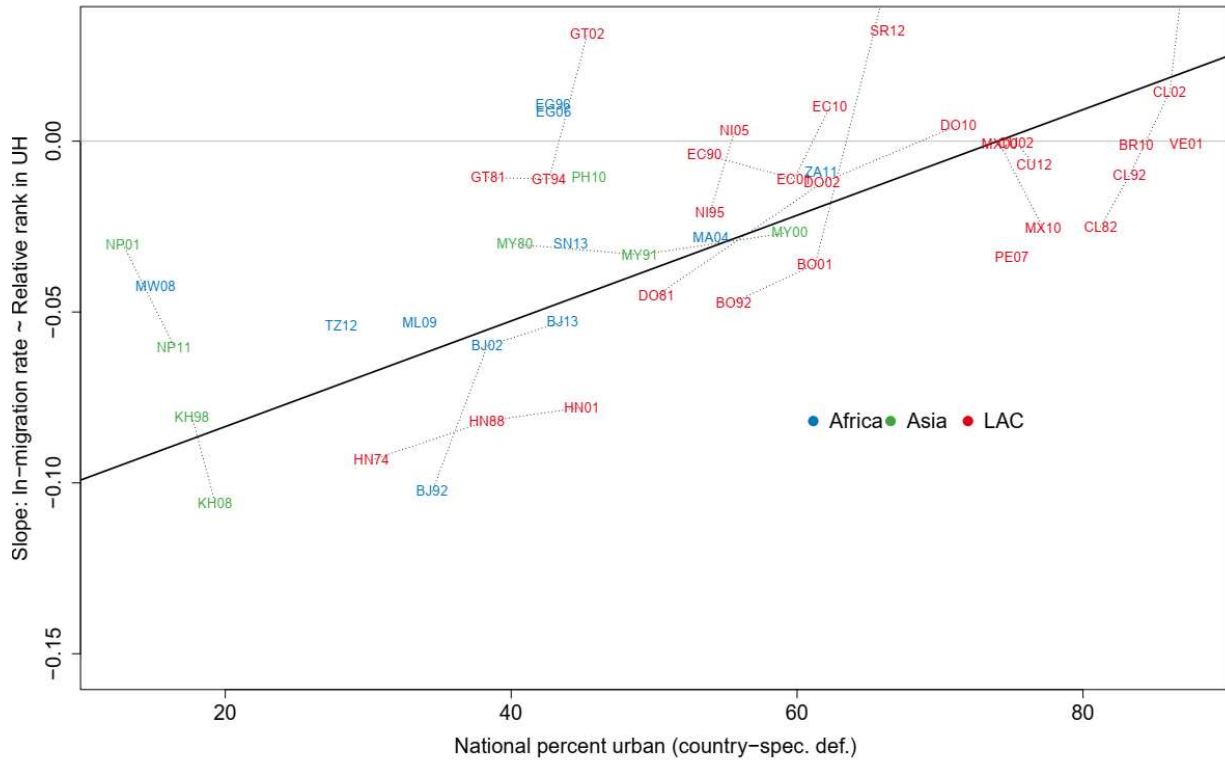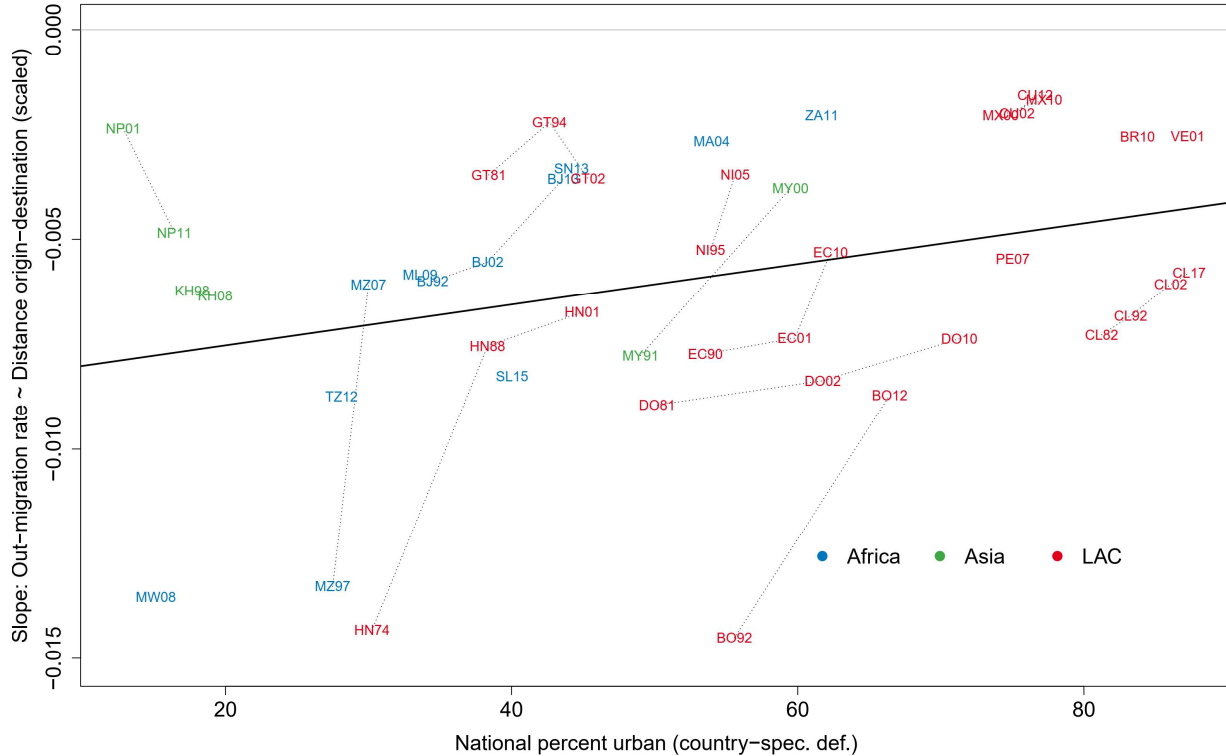

Sources: URBDEMO collection of IPUMS data. Note: country names corresponding to the iso2 codes can be found in the Appendix.

With progress in the urban transition, the association weakens significantly but remains negative (coefficients reach levels close to zero in highly urbanized countries). The intensity of in-migration is thus more and more equally distributed across to urban hierarchy. As the regional diffusion of development in advanced stages of the urban transition diversifies the urban hierarchy, lower ranked destinations indeed become more attractive over time.

How can we reconcile the quasi-generalization of dominant upward migration from all but the highest ranked tiers of the urban hierarchy with the homogenization of in-migration levels across the ranked settlements over the course of the urban transition? Although upward migration becomes more generalized, the distance of migration journeys may change over time. Figure 7 shows the changing relationships (e.g., regression coefficients from country-year specific regressions) between the rate of bilateral out-migration and the distance between the centroids of the origin and destination places (scaled by country to facilitate international comparison). In early stages of the urban transition, the regression slopes were strongly negative: the level of out-migration is higher over shorter than longer distances. As the transition progresses, however, this negative relationship significantly diminishes in intensity.

Figure 7: Relationship between intensity of bilateral out-migration and the scaled distance between origin and destination place (regression coefficients) over the stages of urbanization, 41 developing countries 1970-2017.

Sources: URBDEMO collection of IPUMS data. Note: country names corresponding to the iso2 codes can be found in the Appendix.

The reduced impact of distance on out-migration rates is confirmed within countries over time. This is particularly true in urban out-migration and downward flows (not shown). Hence, intermediate-sized cities appear to become more attractive mainly for residents in upper tiers of the urban hierarchy, rather than for rural-to-urban migrants. This can be explained by congestion effects in central places and better connectivity to other cities, due to the improvements in transport infrastructure and more intense economic interactions that accompany the regional diffusion of development within countries.

Tentative discussion

In this descriptive analysis of the URBDEMO collection of IPUMS census data, we have tested the hypotheses of a mobility transition and differential urbanization in an unprecedented large sample of developing countries including more than 1200 functional urban areas and 500 differentially urbanized regions. The spatial extent of these settlements constituting the urban hierarchy have been defined consistently across space and time by relying on remote sensing data on population and the built-up environment. Results challenge the main theoretical propositions derived from Zelinsky's and Kontully-Meyers' analyses of the urbanization process in Western countries over the 19th and 20th centuries.

Migration between cities play a crucial role early in the urbanization process, rather than only in advanced stages. While theory conjectures an initial diffusion of migration from the immediate rural

hinterland of primate cities towards peripheral areas over time, our results suggest that migratory behaviors start to emerge in cities alike. This may be related to the conditions in which contemporary developing countries urbanize and develop economically, when compared to the historical experiences in Western countries. Economic growth in developing countries' cities is often triggered from abroad through foreign direct investment in a context of hyper-globalisation, building on a historical legacy of colonialism, rather than resulting from a domestic (endogenous) process of development(Fox and Goodfellow 2022). The mode of development also focuses more on the industrial and especially the service sectors, rather than on the agricultural sectors. Thus, the take-off phase of development involves mainly urban populations, who have the incentives and means (i.e., financial resources and experiences in modern urban markets) to adjust their residence location to the changing economic geography of cities, as driven by international trade and services. This innovative mobility behavior is then massively diffused into rural population in later stages of the urban transition.

Rural-to-urban migration indeed rises over the course of the urban transition. Yet the rates remain high until late stages of the transition, at which we observe only timid indications for a levelling off. This inconsistency with the hypothesis of a mobility transition can again be related to the exogenously driven development in cities, which continuously widens rural-urban inequalities in economic opportunities and the availability of public services. Moreover, demographic growth in rural areas of contemporary developing countries is higher than in the historical settings of Western countries. Due to the international diffusion of public health, mortality levels are lower while fertility levels remained higher, thereby leading to a stronger demographic pressure on agricultural land and the functioning of rural societies. Climate change may also undermine rural livelihoods continuously push people into cities. The massive and unabated rural exodus depletes local services and deters governmental investments, which may further motivate the rural population to leave. Thus, migration may ultimately deplete the entire rural population, rather than only the young people in the labor force.

Over the course of the urban transition, out-migration up the urban hierarchy exceeds the downward flow in increasingly higher ranked sending places. At high levels of urbanization, the dominance of downward migration is observed only in top ranked sending settlements, rather than among intermediate-sized cities alike. However, the range of attractive destinations widens over the course of urbanization, as development diffuses down the urban hierarchy. In-migration rates were highest at the top of the urban hierarchy in early stages of the urban transition, while in later stages we observe a more generalized attractiveness of cities involving also intermediate-sized and lower ranked ones. While Seldon's (1997) synthesis of many case studies concluded that a persistent development bias towards the capital cities has motivated migrants in several developing countries to continuously focus on these primate cities, our results are more in line Stouffer's (1940) hypothesis of intervening opportunities. Despite an intensifying upward focus of out-migration over course of the urban transition, intermediate-sized and smaller cities absorb parts of the out-flows that was directed to the top tier of the urban hierarchy in less urbanized contexts. At the same time, the distances of migration have increased, particularly among urban out-migrants moving towards better connected cities further down the ranking of settlements.

Finally, the intensity of urban-to-rural flows declines over the urbanization process. While urban-to-rural migration is usually associated to within city-movements in the context of urban sprawl in Western countries, this flow is often composed of former rural-to-urban migrants' return movements in developing countries situated at early stages of urbanization. With further advances in urbanization and development, rural-to-urban migrants ensure a more permanent basis for urban living.

Appendix

Country names and iso2 codes:

BF	Burkina Faso		MN	Mongolia
BJ	Benin		MW	Malawi
BO	Bolivia		MX	Mexico
BR	Brazil		MY	Malaysia
BW	Botswana		MZ	Mozambique
CL	Chile		NI	Nicaragua
CN	China		NP	Nepal
CO	Colombia		PA	Panama
CR	Costa Rica		PE	Peru
CU	Cuba		PH	Philippines
DO	Dominican Republic		PY	Paraguay
EC	Ecuador		RW	Rwanda
EG	Egypt		SL	Sierra Leone
GT	Guatemala		SN	Senegal
HN	Honduras		SR	Suriname
ID	Indonesia		TH	Thailand
IN	India		TZ	Tanzania
IR	Iran		UG	Uganada
KE	Kenya		UY	Uruguay
KH	Cambodia		VE	Venezuela
MA	Morocco		VN	Vietnam
ML	Mali		ZA	South Africa

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