Urbanization and Survival: Shaping the Rise in Life Expectancy across Latin America

Short abstract

The population of Latin America and the Caribbean increased tenfold between the beginning of the 20th century and the first decades of the twenty-first: from 60 million in 1900, it reached 622 million people in 2018. Most of this impressive growth has been concentrated in the urban areas. Urbanization came along with increasing survival in Latin America. Urban areas have historically held an advantage in terms of development in the region, which has been notorious throughout the evolution of mortality patterns. In fact, the health transition first appeared in the cities. However, the complex interplay between the urbanization process and the advance of the health transition in Latin America remains insufficiently understood. In this context, we aim to disentangle the contributions of the urbanization process to the increase in life expectancy across Latin American countries. We hypothesize that this increase has been highly dependable on the changes in the share of the population living in the largest cities. Preliminary findings for a recent period show that part of the life expectancy increase in some countries is driven by changes in the distribution of the population between spatial-groups.

Extended abstract

Introduction

Since the beginning of the twentieth century, the population of Latin America and the Caribbean has increased tenfold: first, from 60 million in 1900 to 161 million in 1950, then up to 622 million in 2018. This impressive population increase occurred while the annual growth rate was decreasing from more than 5 percent in 1950 to less than 2 percent after 2010. Nowadays, the region represents 8.5 percent of the world's total population (ECLAC 2011). Growth was mostly concentrated in the urban areas: in a period of about 60 years, Latin America went from being predominantly rural to predominantly urban. In 2010, the region's urbanization was virtually consolidated, and 80 percent of the population was living in urban areas, catching up to the levels seen in the United States and many European countries.

During the twentieth century, the rapid urban population growth was due to a real migration revolution, a rural exodus that generated explosive urban growth (Da Cunha and Rodríguez 2009). Most of the rural migrants bypassed the small cities and migrated directly not to just any big city but to the capitals (De Oliveira and Roberts 1996). Caracas, for example, increased its population by nearly 200 percent between 1950 and 1961, while Lima showed an increase of 286 percent between 1940 and 1961 (Dufour and Piperata 2004). With the onset of the 21st century, the evolution of the urban population was limited to natural growth and was incremented only by the migration between cities, the growth of secondary cities, and the emergence of mega-regions and urban corridors. The patterns of capital city primacy remain important in just a few countries and much more complex city networks cover the national territories of most Latin American countries (Baeninger 2002).

Nowadays, 14 percent of the region's urban population lives in megacities with more than five-million inhabitants. Around 25 percent lives in cities whose populations are within a range of five

hundred thousand to less than five million inhabitants, and more than half of the urban population lives in cities with less than 500,000 people (UN-Habitat 2012). All of this translates into a renewed urban dynamism and diversification of the cities. Urban concentration, agglomeration economies, and the expansion of built-up areas enabled economic growth and development in the region (Chen, Zhang et al. 2014). Urbanization took place in the sense of both spatial concentration and the "diffusion" or penetration of urban life modes beyond the geographic space of cities.

As in other regions of the world, urbanization came along with increasing survival in Latin America. Urban areas experienced substantially better quality of the environment in terms of access to piped water and toilet facilities in the house, which is important for explaining the prevalence of infectious diseases such as diarrhoea, which is responsible for a large proportion of infant mortality (Tim, xe et al. 1995). At the same time, the expansion of social-welfare programs resulted in the provision of modern medical care in terms of specialists, hospitals, clinics and special equipment in the largest cities (Browning 1967). The average life expectancy in Latin America and the Caribbean rose from 29 years in 1900 to 74 years in 2010 (PAHO 2012). This advance was influenced mostly by changes that occurred during the 1950s and 1960s, a period of explosive growth that pushed Latin America's population well above other low-income regions (Schultz 1993).

Improvements in survival have occurred continuously during the urbanization process, even during volatile and slow periods of economic growth. Nowadays, low to middle levels of mortality are seen at the national level in most Latin American countries. Still, advances made in overall living standards have not reduced the major disparities in access to health care services and in the provisions of services among countries, geographic regions, and population sub-groups. Urban areas, the largest cities and even more the capital cities have historically held an advantage in terms of development in the region, and this advantage has been notorious throughout the evolution of mortality patterns. The health transition has first appeared in the urban areas (Tanner and Harpham 2014), and the most urbanized countries have proceeded more rapidly through the transition (Jaspers and Orellana 1994; ECLAC 2014). Even nowadays that cumulative deficit in infrastructure, resources and regulations have led to the largest cities in Latin America becoming distinguished by poverty, precariousness, informality and anomy, they continue to hold the lowest level of mortality of their respective territories (García and Meslé, 2024).

Undoubtedly, urbanization has worsened the unequal geographical development and exacerbated the social economic and spatial inequalities. However, the complex interplay between the population of the territories during the processes of urbanization and metropolization, and the advance of the health transition remains insufficiently understood. In this context, our objective is to disentangle the contributions of the urbanization process to the increasing life expectancy across Latin American countries. Specifically, we aim to quantify the extent to which changes in national life expectancy are driven by shifts in the population distribution of the urban systems within the countries, aside from improvement in overall survival. Our main hypothesis is that the increase in life expectancy at the national level has been highly dependable on the changes in the share of the population living in the largest cities through the urbanization process. The historical favoritism of the main cities, especially the capital cities, has resulted in resources being strategically used to increase regional survival in the context of exceptional rapid population growth initially driven by the rural-urban migration. In addition, we aim to identify the variations on the main spatial contributor to the changes in the national life expectancy. Our hypothesis here

is that increases (or decreases) in life expectancy at the national level may be driven by different spatial groups, such as the capital or medium-sized cities according to the stage of each country in the urbanization process.

We analyze six countries—Brazil, Chile, Colombia, Mexico, Peru, and Venezuela—each representing different levels of life expectancy and urbanization between 1985 and 2015. These years were selected to enable cross-country comparison, taking into account the availability of subnational data in each country. We employ three types of recognizable spatial groups for all countries: main and large cities (more than 500,000 inhabitants); medium-sized and small cities (20,000 to 499,000 inhabitants); and towns and rural areas (less than 20,000 inhabitants). This spatial grouping allows us to capture the urbanization process alongside the evolution of the complex city systems in Latin America.

Data and methods

We compute age-specific mortality rates by using death counts and population estimates by sex and spatial-group category. Death counts come from the official Vital Statistics published by the Ministries of Health in Peru and Venezuela, and by the National Statistics Offices in Chile, Colombia and México. Population estimates refer to those produced by the National Statistics Office in each country. These data are matched by clustering the minor administrative units (MIAD) assigned to the cities. The MIAD is the equivalent of a county in the United States of America and of a *département* in France.

We adjusted mortality rates to account for: incompleteness (identified as underreporting levels), and instances of misreporting and missing information in reported age, and sex. The completeness of the death reports in each country were assessed by applying indirect methods on census and civil registration data. We specifically used a combination of the General Growth Balance and the Synthetic Extinct Generation for adult mortality, and the Brass method in Trussell variant in the case of infant mortality. Afterwards, the levels of incompleteness were linearly inter and extrapolated into annual values to adjust the official Vital Statistics (García 2020). These adjustments ensure comparability across time and countries

As for the methods, we built the sex-specific life table for each year of analysis and spatial-group category. Then we used the information from these life tables to decompose the change in life expectancy at birth between 2005 and 2010 (for each country and sex) into the age-specific contributions of the following components: 1) changes in the mortality rates and 2) changes in the composition of the population between spatial groups. This decomposition method was used previously to analyze the contribution of these two components in a context of rapid urbanization in a European country during the mid-19th and early 20th century (Torres, Canudas-Romo and Oeppen 2019). Here we apply that method because we want to disentangle the effects of changes in the population composition of the spatial groups from the effects of changes in mortality in the context of life-expectancy increase in various Latin American countries.

For this abstract, we chose to present preliminary results for the years 2005 and 2010. Nevertheless, analyses for a more extended period (1985-2015) will be included by the date of the conference.

Preliminary results

Table 1 shows the population distribution (per cent) by spatial-group category in each study country and year, for each sex. Except for Mexico, the proportion of the population in the main cities is larger among females than males. The latter have a slightly higher proportion than females in the 'towns and rural' category. In Brazil, Chile and Venezuela, there was a slight decrease in the share of the population living in the main cities, and a modest increase in the share of the population living in medium and large cities. In Colombia, Mexico and Peru, the share of the population living in the main cities increased a little (as did the share in medium and large cities in Colombia and Mexico), while the share of the population in towns and rural areas declined. Venezuela is the only country where the proportion of the population living in towns and rural areas increased between the two observed years.

Table 1. Population distribution (%) by spatial group in 2005 and 2010, by country and sex

Country	Sex	Main cities		Medium and large cities		Towns and rural	
		2005	2010	2005	2010	2005	2010
Brazil	F	43,4	43,1	29,2	29,4	27,4	27,5
	M	41,7	41,4	29,2	29,5	29,1	29,1
Chile	F	44,4	44,1	35,7	36,3	19,8	19,5
	M	42,8	42,5	36	36,5	21,2	20,9
Colombia	F	43,2	43,5	28,1	28,3	28,7	28,2
	M	41	41,4	27,8	28,1	31,2	30,5
Mexico	F	40	40,5	31,7	32	28,3	27,5
	M	40,4	41,2	31,5	31,7	28,1	27,1
Peru	F	37,2	37,9	38,6	38,6	24,2	23,5
	M	35,9	36,5	38,7	38,6	25,4	24,9
Venezuela	F	48,8	48,1	36,1	36,6	15,1	15,3
	M	47,2	46,6	36,6	37	16,2	16,4

Table 2 shows the estimated expectation of life at birth (e0) for each sex and year of analysis, by country. The last column shows the total change in e0 between the two years, i.e., the difference between e0 in 2010 and e0 in 2005. In 2005, the country with the highest life expectancy was Chile (75.4 for females and 74.2 for males), whereas the country with the lowest life expectancy was, for females, Peru (73.7) and, for males, Brazil (67.5). In 2010, Chile continued to be the

country with the highest life expectancy for both sexes (79.8 for females and 74.8 for males) and Brazil the country with the lowest male life expectancy (69.12), while Mexico became the country with the lowest female life expectancy (74.5). In terms of life expectancy changes, Brazil, followed by Colombia and then Peru experienced the largest increases between 2005 and 2010. In these countries, life expectancy increased for more than half a year for both sexes. In Chile, male life expectancy also increased by more than 6 months whereas the increase for females was smaller (4 months). In Mexico and Venezuela, female life expectancy increased slightly (1.6 and 5.3 months respectively) while male life expectancy decreased (-8.3 months and -1.3 months respectively). The results of the decomposition of these total changes into the contributions of changes in mortality and changes in the composition of the population between spatial groups are shown in Figure 1.

Table 2. Life expectancy at birth (e0) in 2005 and 2010 and total change, by sex

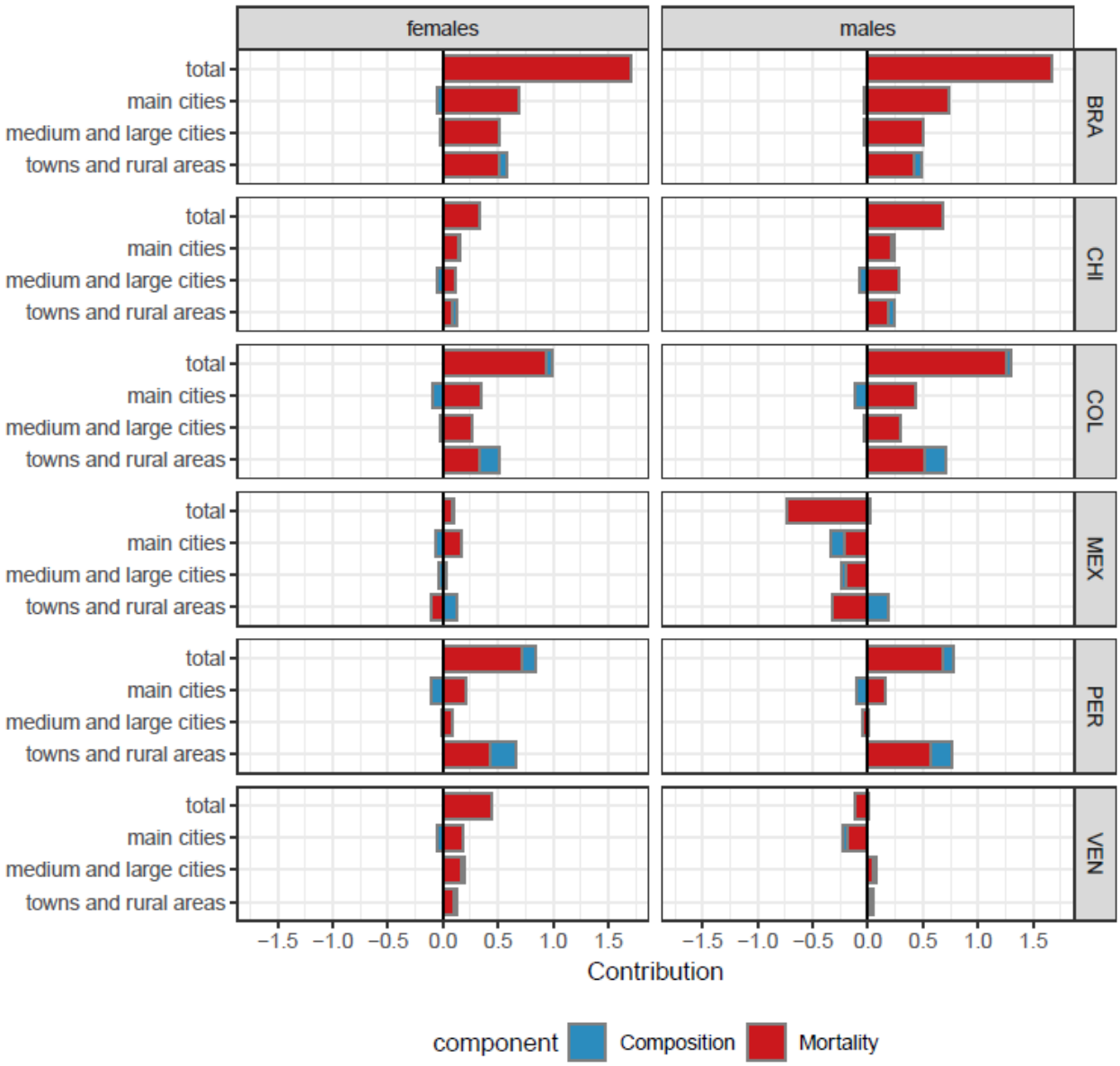
Country	Sex	e0 2005	e0 2010	Change
Brazil	F	74,83	76,47	1,64
	M	67,51	69,12	1,61
Chile	F	79,41	79,75	0,34
	M	74,16	74,82	0,66
Colombia	F	74,1	75,08	0,98
	M	68,26	69,54	1,28
Mexico	F	74,32	74,45	0,13
	M	70,4	69,71	-0,69
Peru	F	73,7	74,52	0,82
	M	69,94	70,7	0,76
Venezuela	F	76,68	77,12	0,44
	M	70,19	70,08	-0,11

Figure 1 shows the total contribution of each of the two components (i.e., changes in mortality and in population distribution) for each spatial group. The bar for the category “total” (which indicates the sum of the effects of the spatial-group categories), shows clearly that in all study countries the life expectancy changes between 2005 and 2010 occurred mainly as a result of changes in mortality. The contribution of changes in the composition of the population in the spatial groups is very small but positive only in Colombia and Peru, where the positive contribution of the ‘composition’ component for the towns and rural areas is larger than the negative contribution of the same component for the main cities. In the other countries, this component did

not contribute, on the whole, to the changes in life expectancy, as the effects between the different spatial groups cancel themselves out. In terms of whose mortality changes contributed the most to the changes in life expectancy, there is no pattern valid for all countries. In some cases, like Brazil (both sexes), Mexico (females), and Chile (females), the largest positive contributions from changes in mortality come from the main cities. In other cases, like Chile (males) and Venezuela (females), the positive contributions from the main cities and the medium and large cities are very similar. Finally, in some countries, the positive contributions from mortality reductions in the towns and rural areas are as large as those from the main cities (Colombia) or even the most important ones for the total increase in life expectancy (Peru).

The next steps, which will be available by the date of the conference, will be to further disaggregate the results shown in Figure 1 by the age-specific contributions and extend the analysis period, starting in 1985.

Figure 1. Contribution of each spatial group in terms of changes in mortality and in population distribution to the total difference in life expectancy at birth between 2005 and 2010



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