DOI: http://dx.doi.org/10.22185/24487147.2022.114.20

The future of ageing in Latin America and the Caribbean from different methodological perspectives

El futuro del envejecimiento en América Latina y el Caribe: Nuevas perspectivas metodológicas

Jeroen Spijker

Centre d'Estudis Demogràfics (CED), Barcelona, España

Abstract

This article provides an overview of several indicators as alternatives to the most traditional instrument used to measure population ageing in the past, present and future in Latin America and the Caribbean. Results show that when we think about old age not only in terms of years lived, but also in terms of years left to live, almost all of the current Latin American populations are rejuvenating instead of aging. This is due to the improvements in life expectancy at advanced ages; ergo, age acquires a new meaning. Concurrently, the proportion of women in the labor market and the activity rate of older workers are increasing. Both trends, together with technological improvements, have not only increased economic productivity, but also increased tax revenues for the states. As a consequence, for every older person there is, theoretically, more public money available to invest in social welfare.

Key words: Ageing, productivity, prospective old age dependency rate, Latin America and the Caribbean.

Resumen

Este artículo proporciona una visión general de varios indicadores alternativos al instrumento más tradicional para medir el envejecimiento para el pasado, presente y futuro en los países de América Latina y el Caribe. Los resultados muestran que cuando pensamos en la vejez no tan solo en términos de los años vividos, sino también, en términos de los años que quedan por vivir, casi todas las poblaciones actuales de América Latina y el Caribe están rejuveneciendo en vez de envejeciendo, debido a las mejoras de la esperanza de vida en edades avanzadas; ergo, la edad adquiere un nuevo significado. Al mismo tiempo, la proporción de mujeres en el mercado de trabajo y la tasa de actividad de trabajadores de más edad está aumentando. Ambas tendencias junto con las mejoras tecnológicas no sólo han aumentado la productividad económica, sino también más ingresos fiscales por parte de los estados. Como consecuencia, por cada persona mayor hay, teóricamente, más dinero público disponible para invertir en bienestar social.

Palabras clave: Envejecimiento, productividad, tasa de dependencia de personas mayores prospectiva, América Latina y el Caribe.

Introduction

The aging of the population is the process by which low fertility and declining mortality leads to changes in the age structure of the population, in which older people make up an increasing proportion of the total (Spijker, 2015). Despite being a demographic dynamic that is well known in most of the developed countries, in the case of Latin America and the Caribbean (LAC), as well as in many other low- and middle- income regions of the world, it is still a relatively recent phenomenon. Nonetheless, it promises to become the dominant demographic dynamic for decades to come.

Undoubtedly, population aging constitutes a triumph of life, but at the same time, it poses new social and economic challenges, for example, in health care, or the maintenance of an optimal level of material production that is capable of meeting the demands of a growing dependent population. For this reason, it has become one of the greatest challenges for contemporary societies (Benítez Pérez, 2017). As more people survive to old age, for each active worker there are more older adults, with a greater propensity to disabilities and diseases than young people, generating greater demands on society as a whole, since available resources flow over time and across generations through a complex system of social, economic, and political institutions (Fürnkranz-Prskawetz *et al*., 2011).

Given the spread of this concern, the latest developments in the literature pertaining to these demographic dynamics focus on the different channels of transmission through which demography can influence the economy, and also provide empirical evidence of the potential effects of such changes through different macroeconomic variables. In this sense, a significant fact has been the improvement in the levels of survival in old age, practically without interruption in the last decades in all LAC countries.

Looking ahead, aging in LAC is expected to intensify over the course of this century, alluding to various concerns among policy makers as well as different social and economic actors (Sojo, 2017). This is especially the case in countries where baby boomers (cohorts born between 1946 and 1964) have begun to retire and the smaller younger birth cohorts represent a larger part of the current, and more importantly, future workforce, as current fertility rates are below the level of generational replacement.

However, the scope, speed and impact of aging have often been exaggerated, since the most common indicator, the Old Age Dependency Ratio

—henceforth TDV— is calculated by only considering the chronological dimension of the age:

$$\text{OADR} = \left(\frac{\sum population\ 65+}{\sum population\ 15-64}\right) * 100$$

This can be misleading, since it is implicitly assumed that there will be no progress or setback in important factors such as life expectancy, labor participation and economic productivity that could alter the per capita expenditures needed to maintain the welfare state of the elderly (Lutz *et al*., 2008; Rivero-Cantillano and Spijker 2015; Spijker, 2015).

Based on the continuous improvements in mortality indicators, as has been the LAC experience since the end of the 20th century, one might question the usefulness of maintaining this approach as the exclusive instrument to measure the region's current and future level of population aging. In today's day and age, it is questionable to consider a 65-year-old to be as old as someone of the same age who lived twenty or fifty years ago, even having lived the same number of years. This conjecture is of vital importance, since we live in an era where the majority of Latin Americans are expected to survive beyond 80 years of age, raising the issue around elderly rights, especially those related to the equity or future sustainability of social security systems (Weller 2018).

Despite the transformations observed in recent decades, and those predicted for the future, we continue to measure and count the elderly today as we did 50 years ago. Thus, 60 or 65 years of age, are often used as a fixed demarcation line between mature adulthood and old age, largely due to the fact that for many years it has been, or was until recently, the legal age of retirement, without taking into consideration, for example, improvements in life expectancy.

In this sense, given the intense demographic change that the region has undergone since the mid-20th century, and based on the prospects of aging towards 2050, arises the need to consider aging not only in terms of years lived, but also in years left to live. Already in 1944, Hersch (1944) proposed the idea of looking at the remaining life years instead of lived years, thus introducing the concept of "potential life years". As Panush y Peritz (1996) show, this form of age measurement has useful applications, such as calculating the number of potential years in the workforce or retirement. Since then, modifications have been made based on Hersch's idea, including Sanderson y Scherbov (2005), Sanderson y Scherbov (2008) y Lutz *et*

al. (2008) who introduced the concept of "prospective age" and proposed new ways to estimate population aging.

This article will provide an overview of several indicators that complement the more traditional instrument for measuring aging, the OADR, for the past, present and future (until 2050) in the LAC region. In this way, the objective of this work is to continue offering a new perspective on aging in the region that contemplates improvements in life expectancy —henceforth LE— as well as economic changes, through alternative indicators.

The article is structured in four large sections. The first briefly describes the transition in the LAC region towards an older society, as well as alternative ways of viewing the concept of age in the context of ageing and improvements in LE at older ages. Next, several alternative indicators of population ageing are introduced and how to calculate them is explained. The results are presented for the LAC countries as a whole in the section that follows. Finally, the usefulness of these indicators to better understand the relationship between the dynamics of population ageing and economic growth is discussed.

Present and future of ageing in Latin America and the Caribbean

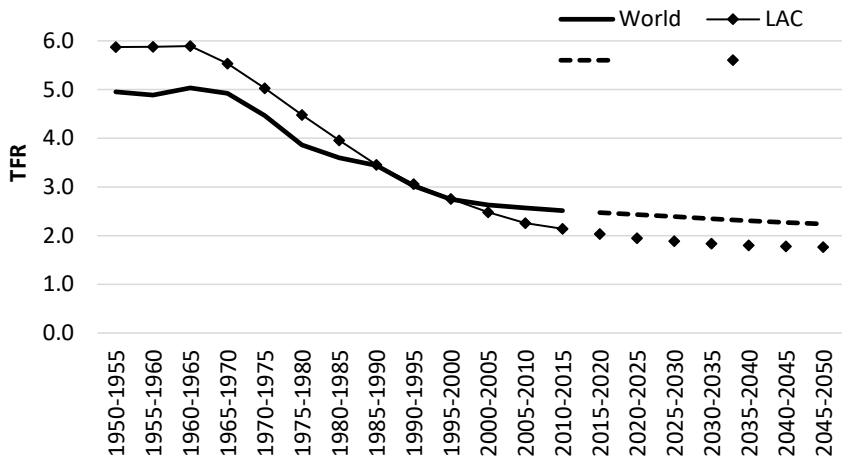
Behind the current process of demographic ageing, there is an accumulation of social, cultural and economic transformations that the region has gone through, at least, in the last fifty years. Ultimately, these factors exert a direct influence on fertility and mortality levels, which are the two variables that, par excellence, have determined the speed with which the population of the different countries in the region has been ageing in recent decades.

The decline in fertility over the past fifty years has left no one indifferent. With a few exceptions, the decline in the number of children per woman has been very rapid, leading to smaller and smaller cohorts. For example, if in the mid-20th century the total fertility rate in Colombia was 6.7 children per woman, today it is only 1.8, going from being among the highest in the region to being among the lowest today (UNDESA, 2019). More and more countries are joining this low-fertility regime, and projections for the near future show a scenario of widespread reduction (see Figure 1).

The speed with which this reduction has taken place when compared to the world average is obvious. Between the 1970s and the first decade of the 21st century, the region's fertility levels declined sharply, falling below the world average. Generally, experiences with low-fertility regimes have

been driven by three "demographic forces": choosing the number of children, postponement of the first birth and the increase in childlessness (Cabella and Nathan 2018), que a su vez se basan en cambios ocurridos en los valores sociales, la disponibilidad de métodos modernos de control de natalidad, la incorporación de la mujer al trabajo productivo y las dificultades de la conciliación del trabajo con la vida familiar (Pardo and Varela 2013).

Figure 1: Total Fertility Rate, Latin America and the Caribbean 1950-2050



Source: Own estimates based on UNDESA (2019) (medium fertility scenario).

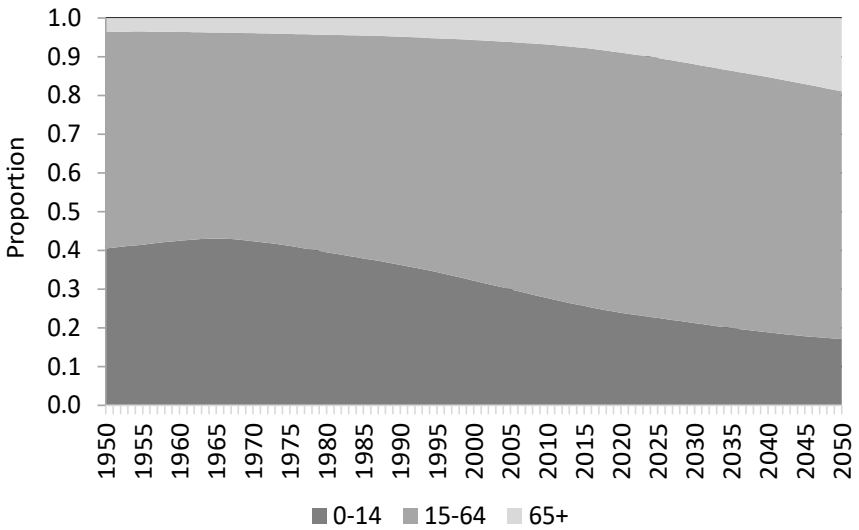
According to United Nations estimates (UNDESA, 2019), today, 20 countries in the region are below the replacement level of 2.1 children per woman, mostly in the Caribbean, in addition to Brazil, Colombia, Costa Rica, Chile, El Salvador and Uruguay. On the other hand, six countries still show high total fertility rates, including Bolivia with 2.8 children per woman, Guatemala (2.9), Haiti (3.0) and French Guyana (3.4), the highest. The remaining countries are slightly above 2.1 children per woman. Looking ahead, it is expected that by 2030-35, only 9 countries will surpass this generational replacement threshold, and already by 2050-55, the low fertility regime will be the general dynamic, placing all the countries of the region below it except French Guyana.

Besides declining fertility levels, the other component of population ageing has been the increase in longevity. Since the middle of the 20th century, its increase has been considerable: In 1950, the average LE at birth in the region was 51 years, while today it is 76 years, a gain of 25 years, and

by 2050, it is expected to reach 81 years as a regional average (UNDESA, 2019).

As a result of these trends, the demographic ageing that the region is currently experiencing is still considered incipient in most of the countries. However, its progress in recent decades has accelerated and promises to become the dominant demographic paradigm in the not-too-distant future. In this sense, projections show a scenario of rapid population ageing in the next two decades (2020-39), with the 65+ reaching 20 per cent of the region's population by 2050 (see Figure 2).

Figure 2: Age structure of the population, Latin America and the Caribbean 1950-2050



Source: Own estimates based on UNDESA (2019) (medium fertility scenario).

Given this scenario's imminence, it is more than necessary to understand population ageing from different analytical perspectives. Reasons why this will provide us with a more complete picture of the demographic and economic implications of population ageing is described in the next subsection.

New methodological perspectives

As a consequence of the increase in LE, also among the elderly, the concept of what is considered old age has changed. Due to the lack of a clear definition, social and behavioral scientists have tended to accept govern-

ment definitions of "pension age" or "retirement age" as a convenient demarcation line between adulthood and old age. However, such a "heuristic device" has at least two shortcomings:

The first is that this line of demarcation is arbitrary and incidental. It does not reflect the various employment histories, the actual average age of retirement,[1] the social responsibilities, economic circumstances and people's health status. Before "retirement age" or "pension age" became its accepted definition, old age was more related to looking old and no longer being able to care for oneself due to a physical or mental illness or frailty, rather than of a matter of exact calendar years (Spijker and Schneider, 2020).

The second drawback is that remaining life expectancy at the chronological age of pension eligibility has increased over time. For example, men and women who were lucky enough to reach 65 years of age in Chile in 1950-55 were expected to live an additional 12 and 13 years respectively. Today, they can expect to live another 18 and 21 years (UNDESA, 2019).

In Critical Gerontology, this static idea of life stages has been questioned by authors such as Grenier (2012) who emphasize "the constructed nature of the life course" (p. 19). By clearly delineating old age from social policy concepts such as retirement age, individual life transitions suddenly became norms and expectations, and "old age" became an abstract concept related to statistical probability. Therefore, in light of increasingly diversified life courses, gerontologists call for more attention to be paid to subjective interpretations, to the narrative that each individual formulates throughout his or her life course, and to the diverse experiences resulting from later life and ageing (Spijker and Schneider, 2020).

Hence the concept of "prospective age". The central point of this perspective is to establish the existence of two different ages, chronological or retrospective, —i.e. all those who are the same age have lived the same number of years— and prospective age, which implies that all those with the same prospective age have the same expected years of life to live. Using the example from Sanderson y Scherbov (2007), if we measure age using 1952 as a basis, we find that a French woman who was 40 years old in 2005 would have a prospective age of 30 years because she had the same

1 In developing countries with precarious labor markets and poor social security systems, the real average age of labor market exit can far exceed the legal retirement age. For example, in 2016, the median retirement age in Mexico was 71.6 years for men and 67.5 years for women compared to the legal age of 65. In the case of Chile, the median age is very similar (71.3 and 67.7 years, respectively), although the legal retirement age for women is only 60 years (OECD, 2017). Among the other countries of the Organization for Economic Cooperation and Development only South Korea has a higher "effective" retirement age.

LE a 30-year-old woman in 1952. Hence the expression "40 is the new 30". Just as financial variables are adjusted for inflation, age can be adjusted for LE (Sanderson and Scherbov, 2010).

An important feature associated with this dimension is the fact that certain behaviors may be more linked to LE than to age, for example, the propensity to save, economic participation or the probability of consuming health services. If we use chronological age, we tend to imagine that people of the same age in different historical periods would behave similarly. However, it would be wrong to assume that a 65-year-old person in 1950 was as "old" as a 65-year-old person in 2018, even though they have both lived the same number of years. This is because the two are unlikely to have aged in the same proportion (Lutz *et al*., 2008). In fact, the increase in LE at age 65 has significantly changed the meaning of chronological age. As Table 1 shows, among men, being the age of 68 in 2010-15 is literally the "new" 65 of 1990-95, given the identical 15 years of LE.

Table 1: Ages in which life expectancy (LE) is equal to 15 years. By sex. Latin America and the Caribbean. 1950-2020

	Remaining years of LE	Approximately at age	
		Men	Women
1950-55	15	60	61
1990-95	15	65	68
2015-20	15	68	72

Source: Own estimates based on data from UNDESA (2019)

In short, since LE has become the main factor in population ageing, age in the chronological sense has lost its relevance in measuring the demographic burden associated with old age. Its main shortcoming is that it does not take into account the improvements in the LE, attributing the same level of age ageing of two people of the same age at two different moments without considering the historical and demographic contexts. Rivero-Cantillano y Spijker (2015) analyzed this new image of ageing in Chile in the context of LAC, contrasting the years lived versus life expectancy, or, in other words, the years lived versus the remaining years of life. They found that once the age is adjusted by the improvements in LE, the Chilean population is actually younger today than it was in the middle of the 20th century.

On the other hand, the OADR, with or without adjustments due to changes in the LE, assumes that all those who are of working age really work,

despite the great social and economic transformations that have taken place this century. In this sense, the knowledge economy keeps young people in the educational system longer, while the unemployed and homemakers are among the largest groups of the economically inactive population. In the case of older workers, some retire voluntarily or by force (for health reasons, having to take care of someone, or having lost their job). However, because there is no unemployment insurance or pension that guarantees a dignified life in LAC countries for most people, few workers can afford to retire early and many even continue working beyond the legal retirement age, even when they already receive a pension. Additionally, the profile of the working-age population has also changed, as greater gender equality and women's increased access to higher education have added millions of working women to the labor market over the past 50 years in the region. These are other reasons why using chronological age to define the working population makes little sense. Indeed, in all high-income countries, including the two LAC countries of Chile and Uruguay, the number of inactive people is higher among those under 65 than among those over that age (http://laborsta.ilo.org, own calculations). Given the economic and labor market fluctuations, it seems logical to include or correct the denominator of the OADR by considering only those in paid employment, as an increase in labor force participation could potentially reduce the per capita costs associated with a growing elderly population. Conversely, high unemployment would do the opposite. In fact, a complementary approach to raising the retirement age in order to ameliorate the burden of population ageing is to increase labor force participation (Scherbov *et al*., 2014). Similarly, Spijker y MacInnes (2013) proposed an alternative to Sanderson y Scherbov's (2007) prospective old-age dependency ratio (POADR) (in itself an alternative to the OADR), dividing the EV-adjusted old-age population by the number of personas employed, which they coined the Real Elderly Dependency Ratio (REDR).

However, since the objective of the different dependency rates is to estimate the "burden" that workers have in paying for the health and well-being of the elderly population, in the case of LAC the use of the employed population as a denominator may lead to an underestimation of the level of dependency due to the high level of labor informality (estimated at 60 per cent for the region; Deza Delgado *et al*. (2020)). As a result of such informality, the state collects much less tax that could be used for social, welfare and health purposes. Hence, this article introduces two more indicators

that aim to capture the real level of old-age dependency. After defining the alternative indicators, they are applied in the LAC context.

Method

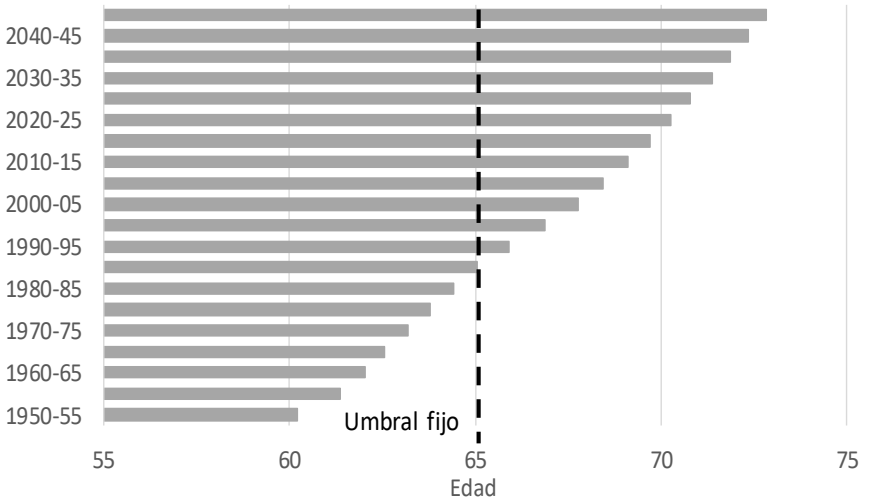
In economic and social perspective, old age is commonly considered to begin at a certain age. The development of social security systems in the mid-twentieth century has placed the age of retirement from economic activity as the threshold for ageing. Currently, in most LAC countries, the age at which people are able to exercise their right to retire is 60 or 65.

This threshold is, without a doubt, the social construction of an assigned category, corresponding to a statistical and arbitrary delimitation that does not consider the multidimensionality of a state that depends on many factors whereby age alone would have no meaning (Aranibar, 2001; Chackiel, 2000; Desjardins and Legare, 1984). However, it is the criterion used by most of the world's social insurances to define the age at which one has access to old-age benefit systems.

Old age has therefore acquired an interpretation that, on the one hand, is chronological (years lived) and, on the other hand, economic (the end of active life and the passage to dependent life). However, since LE has become the main factor behind population ageing, age in its chronological sense has lost its relevance in measuring the demographic burden associated with old age.

Hence, and following Sanderson y Scherbov (2005), a mobile ageing threshold from the exact age at which people have a LE of 15 years or less is established, given the general consensus that during the last 10 to 15 years of life biological deterioration is irreversible (*ibid.*). This new ageing threshold (the exact age at which the LE reached 15 years) will not always be 65 years of age, as is the case with the fixed age threshold. Instead, a change in the ageing threshold in the long term is observed, since the mobile threshold stays below the fixed threshold (age 65) from the mid-20th century until the mid-1980s, after which the scenario is reversed, with the mobile ageing threshold being above 65. It is expected that by the mid-21st century the ageing threshold will exceed 70 years (see Figure 3).

Figure 3: Fixed and mobile threshold (age where e_x=15). Latin America and the Caribbean 1950-2050



Source: Own estimates based on data from UNDESA (2019). For 2020-25 and beyond the results are based on the scenario "medium fertility".

Prospective Old Age Dependency Ratio (POADR)

The POADR has as numerator the sum of men and women who have a LE of 15 years or less, instead of the total of people of 65 years and older as is the case with the traditional OADR (Sanderson and Scherbov, 2007). To obtain the POADR, the numerator is divided by the number of men and women who are 16 years of age or older and have a LE of more than 15 years:

$$\text{POADR}= \left(\frac{\sum_s population\ LE \leq 15}{\sum_s population\ 16+\ \&\ \sum_s population\ LE>15}\right) * 100$$

The incorporation of the prospective dimension in the calculation of population ageing has a direct impact on the levels of old-age dependency, since traditionally the groups of "active" and "inactive" people have been defined by taking into consideration the chronological or retrospective dimension of age. However, as we have already mentioned, this conceptualization of the population's behavior does not bear in mind the improvements made in LE over the course of the demographic transition, which are

behind important changes in behavior (Sanderson and Scherbov 2008). For example, many people over 65 now extend their active lives beyond that threshold, whereas in the mid-20th century the proportion of people reaching this threshold was much less (Rivero-Cantillano and Spijker 2015).

$$\text{REDR} = \left(\frac{\sum_s population\ EV \leq 15}{\sum population\ in\ paid\ employment}\right) * 100$$

Adjusting the denominator: Real Elderly Dependency Ratio (REDR)

Spijker y MacInnes (2013) argue that only those in paid employment rather than all those of "working age" (however they are defined) should be considered as the population that actually "pay" for the health and well-being of older people. In this way, they propose to correct the POADR by including in the denominator the population with a paid job rather than all people of working age. This indicator they call the Real Elderly Dependency Ratio (REDR):

Other alternatives: Macroeconomic indicators

Up to this point, the indicators are already known, although the REDR has never been applied to the LAC context. However, it is precisely in LAC where a high proportion of employment is in the informal sector, which implies a lower contribution of income taxes to total tax revenues in the countries of the region. Therefore, the REDR could be considered an index of the minimum potential burden on workers to cover the needs of the elderly, that is, when the economy does not have informal employment.

Hence, another perspective is to consider the potential capacity of the economy as a whole to be able to cover health and well-being for each dependent elderly adult, defined as the age where LE is equal to or less than 15 years instead of 65 years or older, as is the standard definition. For economists and policy makers, increasing productivity is an important factor in alleviating the negative effects of population ageing by potentially offsetting the decreases in the number of people in paid employment caused by ageing. We consider two ways to measure this: Dividing: i) Gross Domestic Product (GDP) and ii) taxes by the previously defined numerator:

i) GDP/LE≤15: Productivity divided by the old-age population, adjusted for LE

$$= \frac{PIB}{\sum_s population\ LE \leq 15}.$$

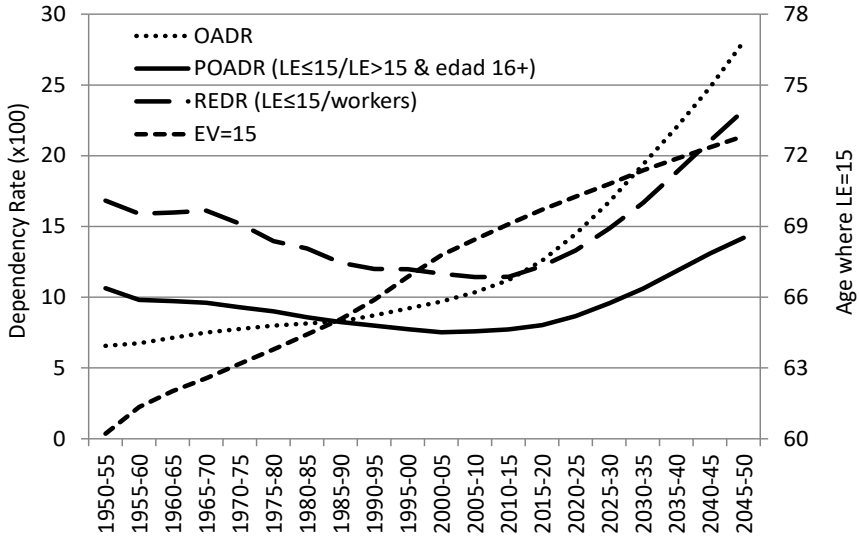
GDP corresponds to current prices in purchasing power parities (PPP) in international dollars (IMF 2019) and the moving old-age threshold is the age where LE≤15.

ii) Taxes/LE≤15: Tax income divided by the old-age population, adjusted for LE

$$= \frac{Taxes}{\sum_s population\ LE \leq 15}$$

Like any other government expenditure, the resources allocated to the health and well-being of the elderly come, to a large extent, from taxes. For this purpose, this indicator divides the total fiscal income via taxes, by the elderly population (age where EV≤15), thereby obtaining the amount of fiscal income (via taxes) for each older person. Taxes are also in international dollars (see note below Figure 4).

Figure 4: Age where LE 15 equals years (LE=15), Old Age Dependency Ratio (OADR), Prospective Old Age Dependency Ratio (POADR) and the Real Old Age Dependency Ratio (READR). Latin America and the Caribbean 1950-2050



Own estimates based on UNDESA (2019) for the indicators OADR, POADR and LE. For 2015-20 and beyond, results are based on the "medium fertility" scenario. For the REDR indicator data published in The Conference Board (2019) were used to estimate the number of workers in paid employment in Latin America and the Caribbean. For the five-year periods between 2020 and 2050, the percentage change in the population aged 15-64 years of Latin America and the Caribbean compared to that observed in 2015-20 was applied.

Results

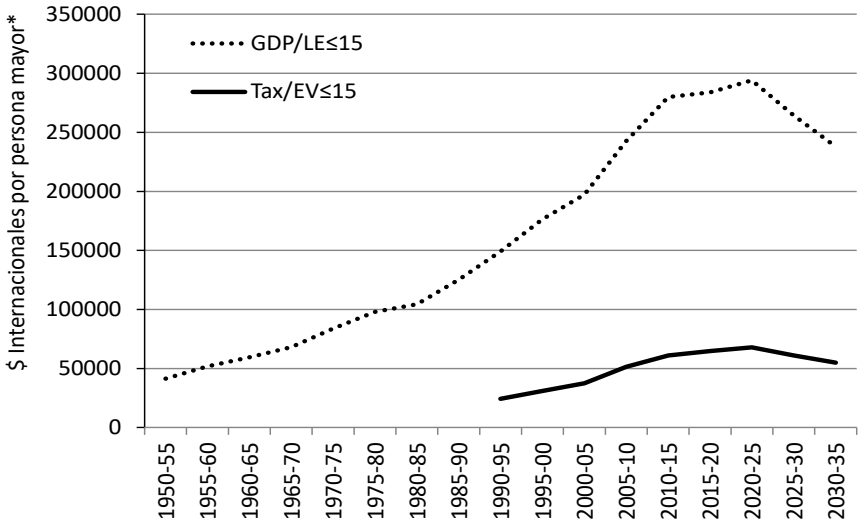
Applying the mobile ageing threshold for the calculation of the OADR, the image of ageing changes significantly (Figure 4). As a consequence, the POADR experiences a sustained decline between 1950 and 2005. Behind this long downward trend, there are the generalized improvements of the LE, especially in advanced ages, which have a direct influence on the increase of the mobile ageing threshold. In comparison, between 1950-1955 and 1980-1985, the POADR is higher than the OADR because the mobile ageing threshold counts older people those who, despite not having reached the age of 65 years, have a LE of 15 years or less. In this sense, through the POADR we can see that, until the early 1980s, old-age dependency was greater. More importantly, however, is the diverging trend compared to the OADR caused by the continuing increase in old-age survival. While the POADR shows a sustained decline from the 1970s to the early years of this century, the OADR shows an inverse trajectory, increasing considerably since the mid-1980s.

Looking to the future, despite the great heterogeneity observed in the LAC region in terms of levels of ageing, both the OADR and POADR are expected to experience an upward trend. However, the expected POADR levels are much less alarming, even in countries with a higher degree of ageing. While country-specific results are not shown here, the ageing dynamics among the countries of the region are converging, although this will not translate into a rapid convergence in actual levels of demographic ageing (OADR/POADR) unless there is a convergence in social and economic development, a necessary condition for improving the population's life expectancy.

If the trend of the POADR is compared with that shown by the REDR, then the latter indicator shows a higher level of dependency as it does not consider the part of the working-age population that does not have paid work. Nevertheless, the trends between these two indicators are similar, although one could mention two important nuances. First, the increase in labor participation in the 1970s and 1980s —mainly due to the increase in female participation in the labor market— had an impact on the decrease observed in the REDR, reducing the gap between the latter and the POADR. Second, in the mid-2010s there is an inflection point, from which the difference between the two indicators begins to grow. This trend is expected to consolidate by 2030. This is explained by the increase in LE at advanced ages, which over the next few decades will cause a growth in the

population group that exists between the legal retirement age and the age at which the moving old-age threshold is situated (the age where LE = 15) (see Figure 4). This population group could be called "the third age", since the vast majority of the people that compose it are in good health, but many are no longer active in the labor market and, therefore, do not contribute directly to the creation of wealth. For LAC as a whole this age is currently around 70 years, but is projected to increase to 73 years by 2045-50.

Figure 5: GDP and tax per older person (age where LE≤15). Latin America and the Caribbean. 1950-2035



Notes: * Age where EV≤15. The denominators of the two indicators are calculated based on population and life expectancy data published in UNDESA (2019). For 2015-20 and beyond the results are based on the "medium fertility" scenario. To estimate GDP, data for Latin America and the Caribbean published in IMF (2019) was used. An annual increase of 2.5 percent has been applied for the subsequent period since the IMF provides an average annual increase of the same percentage between 2020 and 2024, the last year for which data is available. For the period 1950-55 through 1975-80, annual changes in GDP (at "EKS" PPP exchange rate, published by The Conference Board (2019)) were applied on the estimated value for 1980-85. For the Tax/LE<15 indicator, total taxes were obtained by multiplying total tax revenues as a percentage of GDP, as published in OECD/ECLAC/CIAT/IDB (2020).

From a macroeconomic perspective, when we relate GDP to the number of people who exceed the mobile old-age threshold, a strong increase in economic productivity can be observed for each older person in the population to this day, but especially between 1980-85 and 2010-15 (see Figure 5). However, due to the expected future increase in POADR as a result of

the increase in the proportion of older people in the total population —even if GDP would maintain at a constant annual average growth rate of 2.5 per cent—, *ceteris paribus*, there would be a loss of productive capacity for each elderly person in the LAC region. Similarly, if, with respect to taxes, there are no tax reforms and assuming constant future economic growth, there will be an increase in tax revenues per elderly person accrued by the countries from 1990-95 to 2020-25. From that date, this ratio will slowly start to decline, given the strong increase in the elderly population that exceeds the mobile old-age threshold.

Discussion

The modification of the population structure due to the increase in LE (i.e., in terms of the remaining years of life of its members) is a dimension that has not received enough attention because it is technically more complex to measure (Spijker and MacInnes, 2013). By incorporating this new dimension for the analysis of ageing, it seeks to complement the traditional image on which this dynamic is analyzed for the purpose of acquiring a more complete knowledge about it. Observing old age from its two dimensions instead of just one —as is traditionally done— gives us a more balanced image of ageing. Considering that we live in an environment where older people's life expectancy continues to increase, using only the fixed age threshold of 65 years does not provide us with an objective perspective of the state of populations ageing. A better reflection is to complement the traditional image with the years of LE from which a deterioration in health is expected.

The results show that only from the next five years will alternative dependency rates begin to rise notably. However, this is with less intensity than what we can expect from the OADR, which is the indicator most governments rely for their estimates on the ageing of the population and its effects on social welfare. Using the alternative methods proposed here, one can more easily deduce that dependency rates should not only depend on the age structure of a population, but also on its life expectancy, the level of paid employment, economic productivity and the tax system.

The indicators presented in this article depict the supposed burden of population ageing on society in a more specific demographic and economic context. An example of this is the improvements in life expectancy, since being 65 years old today is not the same as it was 50 years ago or 50 years from now. Similarly, the indicators presented here not only require accurate age- and sex-specific population data but with life tables and information

on macroeconomic indicators. Although this information is available (for sources, see Figures 3-5), calculating these indicators is also rather complex and time-consuming, which is probably the main reason why there are no databases or publications yet with alternative indicators of population ageing for all the countries of the world. An exception is the POADR that the United Nations recently published for 2019 and 2050 for all the countries of the world (UNDESA 2020).

In the future, the challenges that an ageing population poses will be seen by the capacity of LAC economies —characterized by their volatility— to achieve economic growth that is sustainable over time and demographically. In this regard, it is first of all increasingly necessary to diversify the economies so that a greater number of workers can find work in the formal sector, and as much as possible in high-productivity jobs, that would be able to sustain a growing dependent elderly population. This effort should involve both economic and educational policies that are capable of providing LAC economies with greater potential in innovation. Formal labor markets must be capable of integrating the older adult population that remains in a position to actively participate in wealth creation and must not exclude them as is the case today. Secondly, it is necessary to provide LAC states with the necessary tools to increase tax collection (not so much in increasing the tax burden, but especially in reducing tax evasion) and at the same time, to move towards progressive tax structures, since current regressive tax systems reproduce and, in cases, increase existing inequalities, especially in old age. However, it should be acknowledged that some categories of workers (e.g., low-skilled workers) may be limited in the labor opportunities in the formal sector that are available to them (Deza Delgado *et al*., 2020). This is why a significant proportion of people in LAC do not exit from the labor market to access retirement but will stay employed while their health allows it since most pension systems do not ensure a decent living or because they have no pension at all (Weller, 2018). Encouraging formal employment and increasing tax revenues would then improve the coverage and level of retirement pensions.

Given the heterogeneity of LAC, not only in relation to levels of ageing but also in terms of economic productivity, tax revenue and social welfare expenditures, future research should consider country-specific analyses. An important issue to look into is whether the increasing trend in welfare spending since the 1990s (the most important change was the introduction of conditional cash transfer programs, originally implemented in Brazil and Mexico) (Justino and Martorano, 2018) will be able to keep up with

the speed that populations are ageing and if specific occurrences, such as a new economic, political (e.g. as in Venezuela) or health crisis (e.g. the current COVID-19 pandemic), will not provoke a negative effect. For example, in the case of Cuba that has the most aged population in the region, its government already collects more than 40 per cent of the GDP value in taxes (compared to only 16 per cent in Mexico; OECD/ECLAC/CIAT/IDB (2020)), which has permitted them to provide universal and free education and health systems for its citizens. That said, although retirement pensions only cover a small proportion of basic needs, while economic and social welfare reforms, an ageing population, underemployment, the economic decline in 2016 and the damage caused by Hurricane Irma in 2017 have caused serious economic problems. Hence, meeting today's challenges requires higher and sustained economic growth and further structural reforms in order to obtain the necessary resources to finance appropriate social policies (Mesa-Lago, 2017).

It should be mentioned that we did not examine ageing indices such as the *Global AgeWatch Index*, *Hartford Index of Societal Ageing, Aegon Retirement Readiness Index*, or the *Active Ageing Index* (AAI) in this work, the latter also being available for LAC countries. These indices are more measure of the "quality" of ageing than its "level". Although they appear to be simple comparisons, the underlying methodologies are complex and prone to judgement, often applying complex weighting schemes based on the judgement of their authors or other experts. These may be better than equal weighting, but there are few ways to objectively choose weights, and different experts seem to choose different weighting schemes (Chomik and Rodgers, 2018). For example, the AAI is an average of 22 indicators ranging from employment rates to political participation to LE. While these multidimensional measures have been successful in highlighting the multiple dimensions of change in health, life expectancy, capabilities, and human capital among today's older people, they have serious drawbacks according Balachandran y James (2019). One is that these measures consider the population above an ageing threshold that is traditionally based on 60 or 65 years as older people despite time changes and differences between countries in terms of health. This is something that the indicators presented here do contemplate because they consider the population over a certain age, which is determined by life expectancy not by a fixed age, but which still is a quantity that can be objectively measured with little variations in its quality in time or between countries. The purpose of these indicators is therefore not so much to assess the "readiness" of the older population

but rather the relationship between "real" population ageing and a single unweighted economic indicator (the number of workers, economic growth (GDP), or public finances obtained through taxes) instead of many and weighted subjectively.

Finally, the inexorable ageing of Latin America and the Caribbean has put the debate regarding future social and economic development, the recognition of the rights of older adults and the challenge of achieving inclusive societies that respect all ages on the table (Huenchuan 2009). If the protection of the childhood was the task of the 20th century, during this century it is necessary to advance in the protection during old age. For that it is necessary that the system of economic productivity takes into consideration older adults and regulates their rights, allowing them to lead a dignifying life.

References

Aranibar, P., 2001, *Acercamiento conceptual a la situación del adulto mayor en América Latina*, CEPAL.

Balachandran, A. y James, K. S., 2019, "A multi-dimensional measure of population ageing accounting for Quantum and Quality in life years: An application of selected countries in Europe and Asia", in *SSM - Population Health*, 7, 100330.

Benítez Pérez, M., 2017, "Envejecimiento poblacional: actualidad y futuro", en *Medisur*, 15, (1), 8-11.

Cabella, W. y Nathan, M., 2018, *Los desafíos de la baja fecundidad en América Latina y el Caribe*. Disponible en https://lac.unfpa.org/es/publications/los-desaf%C3%ADos-de-la-baja-fecundidad-en-am%C3%A9rica-latina-y-el-caribe.

Chackiel, J., 2000, *El envejecimiento de la población latinoamericana: ¿hacia una relación de dependencia favorable?*, CEPAL.

Chomik, R. y Rodgers, D., 2018, *Measuring up? International Indices of Ageing. ARC Centre of Excellence in Population Ageing Research*. Available in https://cepar.edu.au/sites/default/files/2018_FS_Measuring_Up_International_Indices_of_Ageing_0.pdf.

Desjardins, B. y Legare, J., 1984, "Le seuil de la vieillesse: quelques réflexions de démographes", en *Sociologie et sociétés*, 16, (2), 37-48.

Deza Delgado, M. C., Jara, H. X., Oliva, N. y Torres, J., 2020, *Financial Disincentives to Formal Employment and Tax-Benefit Systems in Latin America*, Euromod Working Paper Series, EM 08/20.

Fürnkranz-Prskawetz, A., Ronald, D., Lee, S.-H. L., Lindh, T., Mason, A., Miller, T., Mwabu, G., Ogawa, N. y Soyibo, A., 2011, "The economic consequences of population aging", in *NTA Bulletin*, No. 3.

Grenier, A., 2012, *Transitions and the Lifecourse: Challenging the Constructions of 'growing Old*, Bristol, Policy Press.

Hersch, L., 1944, *De la démographie actuelle à la démographie potentielle, Melange des Études Economiques Offertes à William Rappard*. Geneva: Georg.

Huenchuan, S., 2009, *Envejecimiento, derechos humanos y políticas públicas*, Santiago de Chile, Naciones Unidas.

IMF, 2019, *World Economic Outlook Database*, (Version) October 2019. Available in https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/download.aspx. Consultado el 22/12/2019.

Justino, P. y Martorano, B., 2018, "Welfare spending and political conflict in Latin America, 1970–2010", in *World Development*, 107, 98-110.

Lutz, W., Sanderson, W. y Scherbov, S., 2008, "The coming acceleration of global population ageing", in *Nature*, 451, (7179), 716-719.

Mesa-Lago, C., 2017, *Social Welfare and structural reforms in Cuba, 2006–2017*, Papers and Proceedings of the Twenty-Seventh Annual Meeting of the Association for the Study of the Cuban Economy, 2017. 1-17.

OECD, 2017, *Pensions at a Glance 2017. Chapter 5. Figure 5.8. Average effective age of labour market exit and normal pensionable age in 2016*. Paris: OECD Publishing. Available in https://www.oecd-ilibrary.org/social-issues-migration-health/pensions-at-a-glance-2017/effective-age-of-labour-market-exit_pension_glance-2017-24-en. Consultado el 8/9/2020.

OECD/ECLAC/CIAT/IDB, 2020, *Revenue Statistics in Latin America and the Caribbean*, Paris, OECD Publishing.

Panush, N. y Peritz, E., 1996, "Potential demography: A second look", in *European Journal of Population*, 12, (1), 27-39.

Pardo, I. y Varela, C., 2013, "La fecundidad bajo el reemplazo y las políticas familiares en América Latina y el Caribe: qué puede aprenderse de la experiencia europea", en *Revista Brasileira de Estudos de População*, 30, (2), 503-18.

Rivero-Cantillano, R. y Spijker, J., 2015, "Del rejuvenecimiento al envejecimiento de la población ¿o viceversa?: Chile en el contexto de América Latina, 1950-2050", en *Notas de Población*, 101, 127-156.

Sanderson, W. C. y Scherbov, S., 2005, "Average remaining lifetimes can increase as human populations age", in *Nature*, 435, (7043), 811-813.

Sanderson, W. C. y Scherbov, S., 2007, "A new perspective on population aging", in *Demographic Research*, 16, (2), 27-58.

Sanderson, W. C. y Scherbov, S., 2008, "Rethinking Age and Aging", in *Population Bulletin*, 63, (4).

Sanderson, W. C. y Scherbov, S., 2010, "Remeasuring Aging", in *Science*, 329, (5997), 1287-1288.

Scherbov, S., Sanderson, W. C. y Mamolo, M., 2014, "Quantifying policy tradeoffs to support aging populations", in *Demographic Research*, 30, (20), 579-608.

Sojo, A., 2017, *Protección social en América Latina: la desigualdad en el banquillo*, CEPAL.

Spijker, J., 2015, *Alternative indicators of population ageing: An inventory*, Vienna Institute of Demography Working Papers 4/2015. Vienna Institute of Demography. Available in https://www.oeaw.ac.at/fileadmin/subsites/Institute/VID/PDF/Publications/Working_Papers/WP2015_04.pdf

Spijker, J. y MacInnes, J., 2013, "Population ageing: the timebomb that isn't?", in *British Medical Journal*, 347, f6598.

Spijker, J. y Schneider, A., 2021, "The myth of old age: Addressing the issue of dependency and contribution in old age using empirical examples from the UK", in *Sociological Research Online*, 26, (2), 343-359.

The Conference Board, 2019, *The Conference Board Total Economy Database* (adjusted version), April 2019. Available in https://www.conference-board.org/data/economydatabase/total-economy-database-archive.

UNDESA, 2019, *World Population Prospects: The 2019 Revision*. New York: United Nations Department of Economic and Social Affairs (UNDESA) Population Division. Available in http://esa.un.org/wpp. Consultado el 04/06/2020.

UNDESA, 2020, *World Population Ageing 2019*. New York: United Nations Department of Economic and Social Affairs (UNDESA) Population Division. Available in https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Report.pdf.

Weller, J., 2018, *La inserción laboral de las personas mayores en América Latina, Boletín de envejecimiento y derechos de las personas mayores en América Latina y el Caribe*. Available in https://crm.cepal.org/civicrm/mailing/view?id=335.

Curricular information of the author

Jeroen Spijker

Actualmente es investigador del Centro de Estudios Demográficos (CED) donde co-lidera las líneas de investigación "Salud, mortalidad y causas de muerte" y "Cuidado de la gente mayor". En 1994 obtuvo un BA en Sociología y Geografía Humana y un Diploma de Postgrado en Estadística Aplicada en la Universidad de Massey (Nueva Zelanda); en 1997, el Master y en 2004 el Doctorado en Ciencias Espaciales (especialización Demografía) de la Universidad de Groninga (Países Bajos). También ha trabajado para la Universidad Autónoma de Barcelona, la Universidad de Edimburgo y el Vienna Institute of Demography. Sus líneas actuales de investigación incluyen el envejecimiento de la población, la comorbilidad

y múltiples causes de muerte, el efecto de la reciente crisis económica en España sobre la salud de los mayores de 50 años y el futuro de los cuidadores de las personas mayores. Publicaciones recientes: Castro P, Spijker J, Recaño J (2023). "A quasi-cohort trend analysis of adult overweight in Colombia". *Journal of Biosocial Science*, Online first. https://doi.org/10.1017/S002193202300010X; Spijker J, Trias-Llimós S (2023), "Cause-specific mortality in Spain before and during the pandemic: educational differences and its impact on life expectancy using multiple causes of death data". *European Journal of Public Health*, ckad036. https://doi.org/10.1093/eurpub/ckad036; Felix-Vega CF, Spijker J, Zueras P (2021). "Sistema de pensiones y apoyo social a adultos mayores en México, 1979-2019". *Papeles de Población* 27(110):79-107. https://rppoblacion.uaemex.mx/article/view/14567.
email: jspijker@ced.uab.es
Register ORCID: https://orcid.org/0000-0002-3957-9553