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Demographic Change in Mexico (Part I)

An Opportunity and a Challenge for the Insurance Industry

By Juan Antonio Monroy Kuhn

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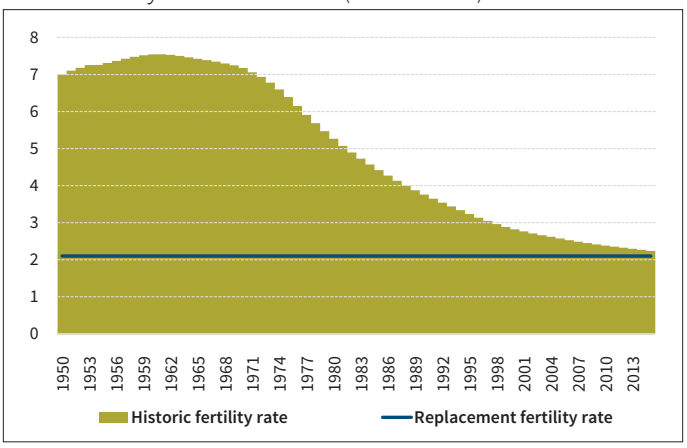
The most recent demographic data published in Mexico allows us to analyze in detail the profound demographic transition that has been taking place in the country for more than four decades. It is possible to develop forecasts for the future on the basis of this historic experience. The purpose of this article is not only to illustrate the profound demographic change in Mexico—and what it is expected to experience over the coming decades—but to highlight the challenges for the insurance industry posed by the various demographic trends. Wherever challenges are found, however, opportunities also exist, provided the industry succeeds in adequately transforming its own processes and meeting the needs of a changing market.

DEMOGRAPHIC CHANGE IN THE PAST

Falling fertility rates are a well-known phenomenon in virtually every country that has experienced a given degree of industrial and digital transformation.[1] What is striking is the speed at which this fall has taken place in many Latin American countries, including Mexico. Whereas the total fertility rate in Mexico averaged 7.35 children per woman between 1950 and 1970, by 2015 the figure had fallen 70%, to just 2.2 children. This represents an annual fall of 1.8% over a 45-year period (1971–2015). The short-term projections of the Mexican National Population Commission (Comisión Nacional de Población—CONAPO)* indicates that the total fertility rate will fall below the replacement rate of 2.1 children during the current year of 2019. The replacement rate is the theoretical fertility rate that would permit a closed population to remain constant over time. The speed at which the total fertility rate has fallen in Mexico is noteworthy when we take into account that the fertility rate in Germany fell by an average of just 0.6% per year between 1955 and 2010.[2] In other words, the same change has been occurring three times as fast in Mexico as in Germany (Figure 1). As we can see from Figure 2, the fall in the fertility rate was preceded by a notable fall in the total mortality rate. Between 1950 and 1990 the mortality rate in Mexico fell at a rate of 2.9% per year, before stabilizing and then showing a slight rise due to the general ageing of the population. A fall in mortality rate followed by a fall in fertility rate, as shown in Figure 2, is a phenomenon that has been observed in many other countries and that is traditionally described by different models of demographic transition.[3]

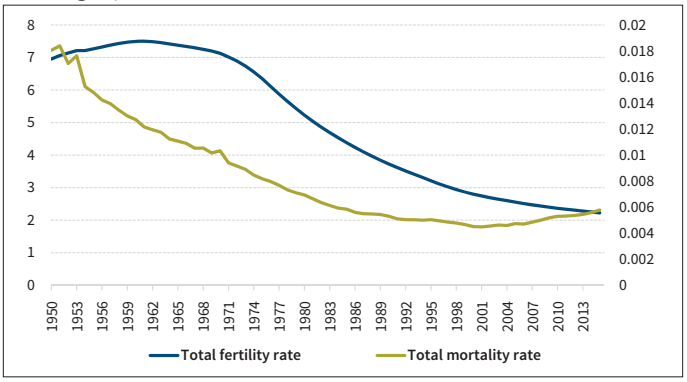
Clearly the combination of the two phenomena has led to a general ageing of the population. The average age of the population rose from 22.3 years in 1950 to 29.97 in 2015 (see Figure 3). Whereas the average age remained constant, or even fell slightly, between 1950 and the mid-1970s, it began rising in linear fashion from 1975 onwards. Similarly, if we assume 65 as the retirement age and 15 years old as the start of working age,

Figure 1
Total Fertility Rate in Mexico (1950–2015)



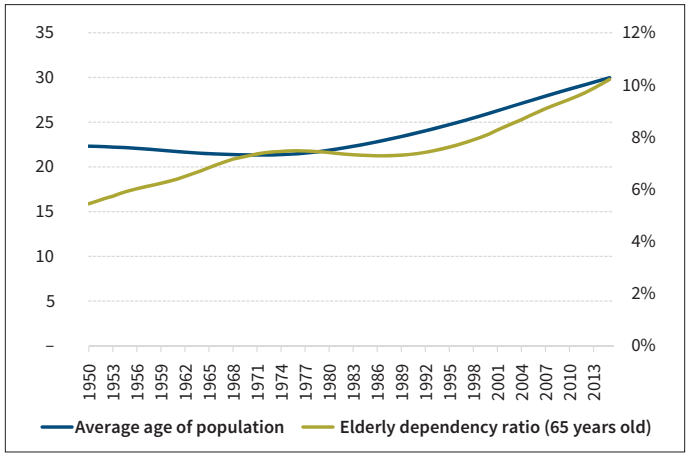
Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Figure 2
Demographic Transition in Mexico (1950–2015)



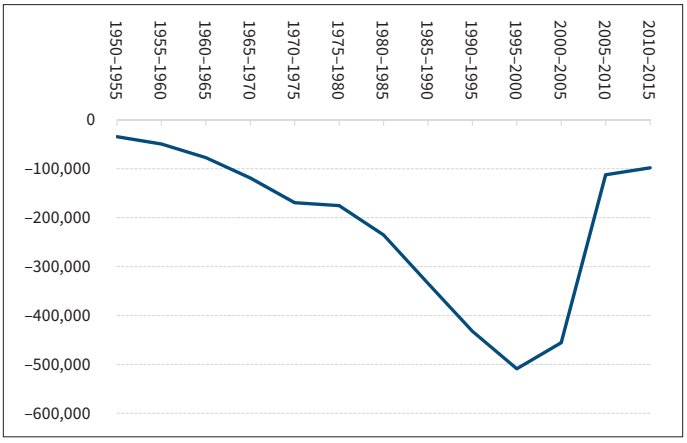
Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950- 2015, Consejo Nacional de Población (CONAPO), 2018."*

Figure 3
Ageing in Mexico (1950–2015)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Figure 4
Average Net Migratory Flow (Mexico, 1950–2015)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

the ageing process may also be observed via the elderly dependency ratio.[4] This ratio is the ratio of the economically inactive population (namely, given our assumption, the population older than or equal to 65 years old) to the working age population. This ratio grew from 5.44% in 1950 to 10.21% in 2015. In other words, whereas in 1950 there were 18.37 persons of working age for each retired person (assuming retirement at the age of 65), in 2015 there were only 9.79 persons, or slightly more than half the 1950 number. This can be seen from the elderly dependency ratio shown in Figure 3.

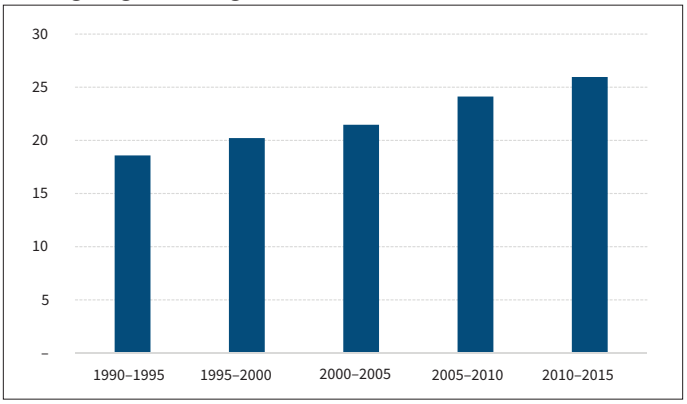
MIGRATION AS A FACTOR CONTRIBUTING TO THE AGEING OF A POPULATION

Mexico has traditionally been a country of high net negative migration, with the United States being the principal recipient of Mexican emigrants. In countries that have fertility rates falling short of the replacement rate and low mortality rates, the migration factor plays an important role, which may or may not accelerate demographic transition. In the case of Mexico, migration is a phenomenon that exerts additional pressure on the ageing of the population.

Figure 4 shows the average net annual migratory flow by five-year periods from 1950 to 2010 between Mexico and other countries. This net negative flow grew steadily from 1950 onwards, reaching a peak between 1995 and 2000 before falling from 2005 to 2016. This fall was largely due to a tightening of U.S. immigration policies from 2008 onwards, which has led to an increased flow of immigrants returning to Mexico.

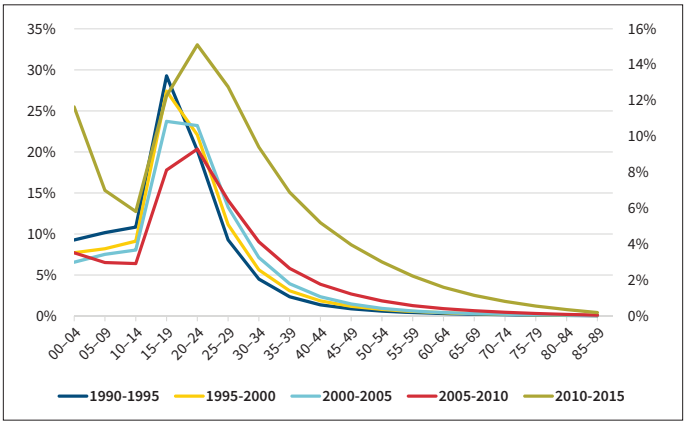
The figures show that the majority of those leaving the country are very young persons—between 20 and 30 years old—although the mix has changed over time, as Figures 5 and 6 demonstrate.

Figure 5
Average Age of Emigrants (Mexico, 1990–2015)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Figure 6
Average Emigration Flow by Five-Year Cohort and Age (Mexico, 1990–2015)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

The increase in the average age of emigrants over the past 25 years can partially be explained, at least until 2010, when it reached its high point, by the natural ageing that Mexico was undergoing. This can be seen from Figure 7, which shows that the ratio between the average age of the emigrants and the average age of the Mexican population remained almost constant from 1990 to 2010. Changes in immigration policies from 2008 onwards have brought in their wake a change in the age structure of emigrants.

Having analyzed the past, we shall now focus on a discussion of various projected scenarios for the short-, medium- and long-term foreseeable future.

A striking fall in fertility rates is shaping the new demographics in Mexico.

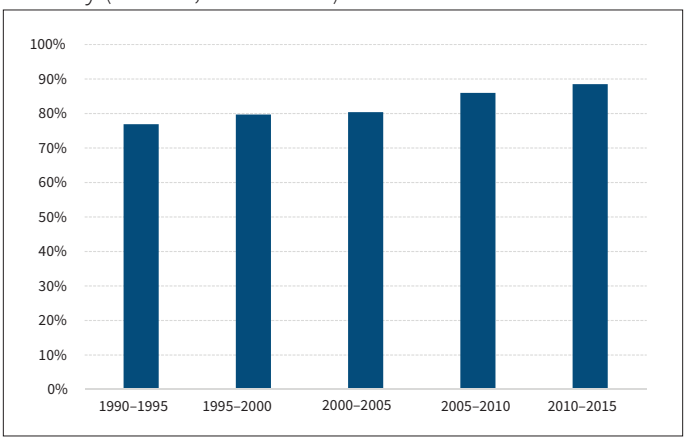
MEXICO IN THE FUTURE

So far, we have been discussing the demographic change Mexico has undergone since 1950. However, a more interesting question, at least from the viewpoint of the insurance industry, is what Mexico will look like in 30 or 40 years' time. In the first instance, the answer is clear: in all probability, society will continue to grow older. However, to what extent will this be the case?

One way of answering this question, at least in approximate fashion, is to use a cohort-component model in order to project the population. In its simplest version, such a model can be used to estimate the population in year *t* as the sum of the population in year *t*-1 plus the births during years *t*-1 and *t*. We then subtract deaths from this total and add the net migratory flow observed during the year. The official population projections published by CONAPO may be approximated via this model, using 2015 as the base year and making the following assumptions:

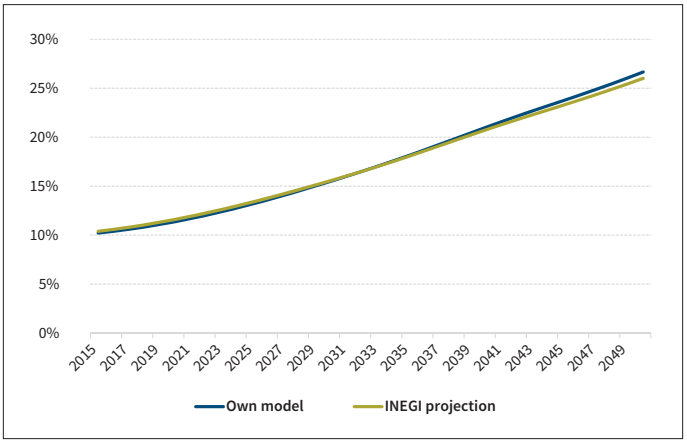
- A linear fall will take place in the total fertility rate of 1.05% per year (taking 2.15 children per woman as the starting point and arriving at 1.70 in 2060).
- On the mortality component side (used to estimate deaths during each year of the projection), our approximation of the official model assumes a constant 1.08% annual improvement in the mortality rates.
- Finally, the National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía—INEGI) assumes an increase by a factor of two in the future net migratory flow as compared with the estimated flow in 2015. Our model introduces this change in linear fashion via the projection.

Figure 7
Ratio of Average Age of Emigrants to Average Age of Country (Mexico, 1990–2015)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Figure 8
INEGI Elderly Dependency Ratio vs Own Model (Mexico, 2015–2050)



Source: Gen Re—Own calculations based on data fo "Proyecciones de la Población de México y de las Entidades Federativas, 2016-2050, Consejo Nacional de Población (CONAPO), 2018."*

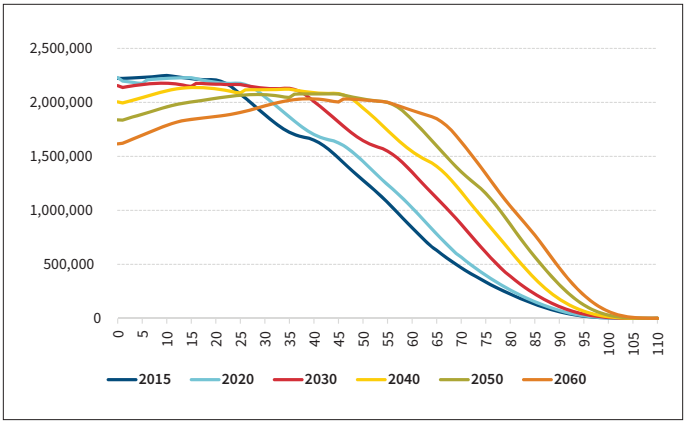
Figure 8 compares the elderly dependency ratio estimated on the INEGI projection base with the approximate dependency ratio arrived at by applying our cohort model as described above. In both models, the ratio is forecast to grow from 10.21% to 26.7% by 2050. That is, by 2050 there are expected to be 3.8 persons of working age per pensioner (assuming a constant retirement age of 65). To put this figure into perspective, it suffices to glance at Table 1, where we can see similar current elderly dependency

Table 1
Elderly Dependency Ratios by Countries (2015)

Country	Dependency Ratio 2015
Mexico	10.4%
Germany	32.1%
France	30.2%
Sweden	31.1%
UK	28.2%
Japan	42.7%

Source: CIA World Factbook.

Figure 9
Population Distribution by Ages and Year (Mexico, 2015–2060)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

ratios in various European Union countries, as well as in Japan, the longest-lived country in the world.

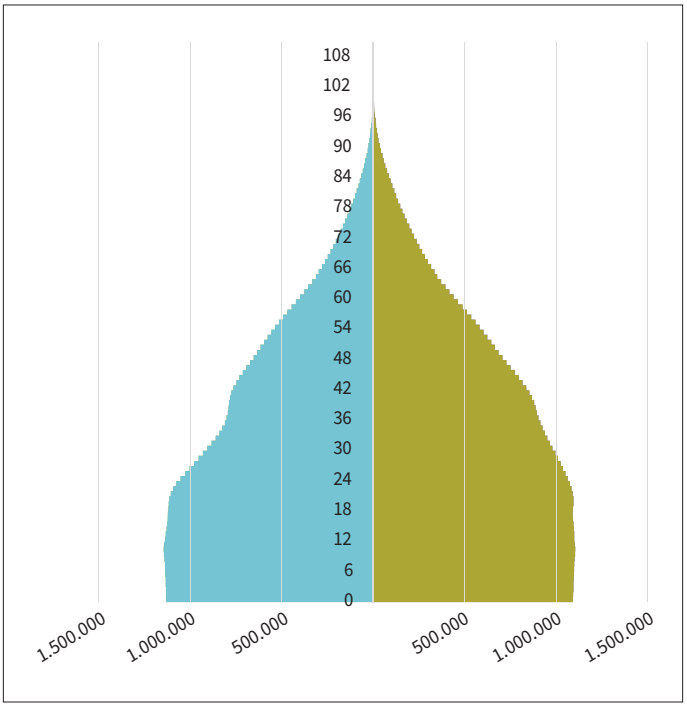
Figure 9 graphically demonstrates the anticipated ageing of the Mexican population. Whereas the 2015 life expectancy at birth in Mexico was 71.7 for men and 77.5 for women, under the assumptions made for our base model, life expectancy at birth in 2060 will be 78.48 for men and 83.2 women, a net increase of 6.7 and 5.6 years respectively.

The ageing expected in the population can also be represented by means of population pyramids, which show a clear trend towards inversion of the population pyramid for 2015 (Figure 10).

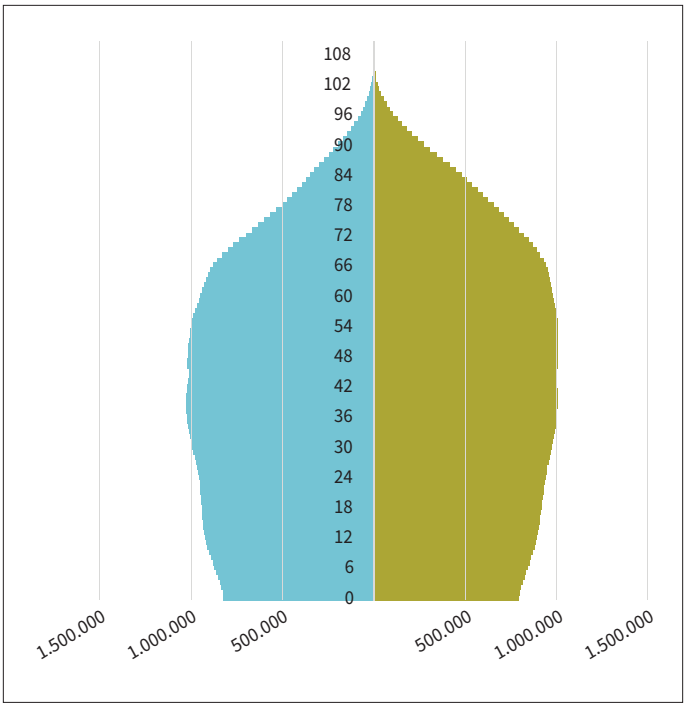
Like any long-term projection, the forecasts of Mexico's future demographic situation depend on the assumptions made for the purposes of the model. Accordingly, it is of particular importance to analyze different scenarios in order to attain a higher

Figure 10
Population Pyramids (Mexico, 2015–2060)

2015 population pyramid



2060 population pyramid



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

degree of certainty concerning the projections made and the possible future scenarios.

Different Future Scenarios

Taking the scenario described above (the Base scenario) as our starting point, we shall now analyze four further scenarios in which we vary one assumption at a time while leaving all the others constant. The variables analyzed are:

- the annual improvement in mortality,
- the total fertility rate assumptions,
- the migratory flow and
- pension age.

Below we discuss each of the scenarios analyzed.

Advance Scenario. In our Base scenario we assume an improvement in mortality of 1.08% p.a. To test the elasticity of our model with respect to this variable, we analyzed the assumption that [there would be] an as yet-unknown spontaneous technological advance bringing about a substantial improvement in the diagnosis and cure of illnesses currently considered incurable, such as certain types of cancer. In this scenario we assume a consequent improvement in mortality of 2.5% p.a. This improvement is assumed to be constant throughout the projection period.

Reduced Migration Scenario. Currently Mexico experiences a negative migratory flow of approximately 100,000 people. This is a significant number when we consider that cities such as San Pedro Cholula (Puebla) or Tula de Allende (Hidalgo) have populations of roughly 100,000. There are indications that U.S. immigration policy could become more restrictive in the short to medium term. Given that the U.S. is the principal country of destination for Mexican emigration, we shall analyze a scenario in which it gains complete control over illegal migration, leading to a neutral annual flow of zero from 2020 onwards.

Uncontrolled Migration Scenario. The average net migratory flow reached an annual peak of –500,000 people during the five-year period 1995–2000. In this scenario, we assume socio-economic disorder within Mexico, leading to a major rise in illegal emigration and a negative net annual migratory flow reaching –300,000 per year from 2020 onwards and then remaining constant until the end of the projection. We further assume that the age structure and sex of the emigrant/immigrant population remains constant and as observed in 2015.

Work Scenario. At the moment, the official retirement age in Mexico is 65. Politicians are currently discussing increasing the retirement age in order to ease the financial pressures that are caused by the ageing population and that are faced by diverse social security and pension payment schemes—for example, the Mexican Institute of Social Security (Instituto Mexicano del Seguro Social—IMSS) system. To visualize the impact of increasing the retirement age on the population structure, we assume an incremental increase in the retirement age of one year every five years, starting from 2020, until reaching a retirement age of 70. This is a realistic scenario if we take a look at the differences between the remaining life expectancy after retirement in 2015 and 2060 respectively within the Base scenario. As can be seen from Table 2, on average men would be living 11 months longer and women almost three months longer after their retirement in 2060 than they would be given their remaining life expectancy after retiring in 2015.

For greater clarity, Table 3 summarizes the changes made in each of the scenarios analyzed.

Impact on Population Growth

The Base scenario forecasts population growth of approximately 0.52% p.a. between 2020 and 2060. In Figure 11 we can see the difference in population size between each scenario and the Base scenario in various different years of the projection. It is interesting to note how the scenario that features an increase in the improvement in annual mortality (Advance) has a similar effect in terms of the projected population size on the scenario in which the net flow of migration is zero (Controlled Migration). Both scenarios involve an increase up to 4% greater (2050) as compared with the absolute population size in the Base scenario. Also noteworthy is the fact that a negative migration flow

Table 2
Remaining Life Expectancy by Sex (Mexico, 2015–2060)

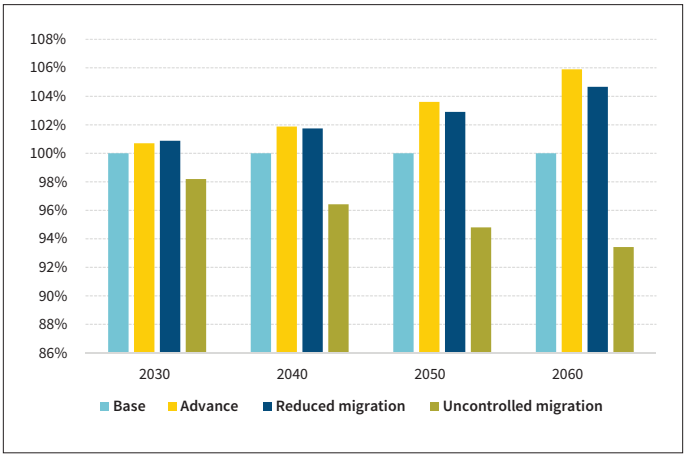
Year	Retirement Age	Remaining Life Expectancy—Men	Remaining Life Expectancy—Women
2015	65	12.08	15.47
2060	70	12.98	15.71

Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Table 3
Summary of Projected Scenarios

Variable	Base	Advance	Reduced Migration	Uncontrolled Migration	Work
Mortality	1.08% p.a.	2.5% p.a.			
Fertility	1.109%				
Migration	–100K		0 p.a. (2020)	–300,000 p.a. (2020)	
Retirement age	65				70

Figure 11
Population Growth by Scenario and Year (Mexico, 2030–2060)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

(Uncontrolled Migration) would lead to a population reduction of 7% by 2060. In other words, by that year there would be roughly 10.3 million fewer people than under the Base scenario.

Impact on Life Expectancy at Birth

As might be expected, the only scenario that alters life expectancy is the Advance scenario since it is the only one that alters the assumptions regarding the annual probability of death and therefore of a person's survival.

As can be seen in Table 4, the Base scenario predicts that life expectancy by 2060 will have increased by 6.7 years among men and 5.6 years among women. The Advance scenario predicts an increase in life expectancy over 220% greater than in the Base scenario, yielding respective increases of 15.18 years among men and 12.85 years among women.

It is important to note that living longer does not automatically entail that the period of life free from illness also increases. In the literature, it is customary to refer to the difference between

Table 4
Life Expectancy at Birth (Mexico, 2015–2060)

Life Expectancy at Birth	Men	Women
Base (2015)	71.76	77.55
Base (2060)	78.48	83.20
Advance (2060)	86.95	90.40

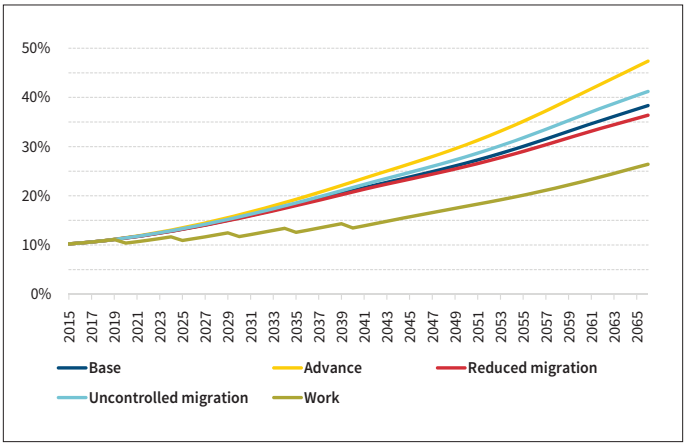
Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

"life span" and "health span," in order to highlight precisely this difference between a long life and a long and healthy life.

Impact on the Elderly Dependency Ratio

The elderly dependency ratio, defined as the ratio of retired people to people of working age, is a good indicator of the expected burden that the working age population will have to face in relation to the people who have ceased working. This indicator is crucial for fixing and financing budgetary expenditure on education, health and pensions, as well as other social security outlay.

Figure 12
Elderly Dependency Ratio by Scenarios (Mexico, 2015–2065)



Source: Gen Re—Own calculations based on the data "Conciliación Demográfica de México 1950–2015, Consejo Nacional de Población (CONAPO), 2018."*

Projections of dependency ratios are very sensitive to the input parameters for the model employed. In our case, the Advance scenario involves a 2060 dependency ratio, which is some 20% greater than in the Base scenario. The models featuring different migratory flows (Reduced Migration and Uncontrolled Migration) have a lesser impact as compared with the Base scenario (of 96% and 107% respectively). As we saw previously, these scenarios do have an impact on absolute population size, but they do not substantially alter the population's age structure.

As can be seen from Figure 12, the scenario that has the greatest impact on the elderly dependency ratio is the Work scenario, which involves an incremental increase in the retirement age from 65 to 70 up until 2040. This scenario leads to a 2060 dependency ratio of 23%; in other words, a rate almost 33% lower than in the Base scenario and 44% lower than in the Advance scenario. This scenario exemplifies the fact that increasing the retirement age could represent the most effective means of counteracting the economic effects that could arise from an ageing society.

The panorama outlined above raises various issues of importance for the insurance industry. In Part II we shall take a more detailed look at different aspects. ■

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ENDNOTES

* *https://www.gob.mx/conapo/acciones-y-programas/conciliacion-demografica-de-mexico-1950-2015-y-proyecciones-de-la-poblacion-de-mexico-y-de-las-entidades-federativas-2016-2050*.

1. The total fertility rate is defined as the average number of children women would have by the end of their reproductive lives if they experience the age-specific fertility rates applying in the study period.
2. Human Fertility Database. Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at *www.humanfertility.org*.
3. This phenomenon was described, for example, in Europe's second demographic transition. D. J. van de Kaa, Population Reference Bureau, 1987.
4. This assumption ignores the average real age of retirement in Mexico and possible legislative changes over time.