# BACHELOR'S THESIS

# THE AGING POPULATION AND ITS EFFECTS ON ECONOMICS IN THE BALEARIC ISLANDS

## Thomas Escandell Wells

**Degree in Economics**

**Faculty of Economics and Business**

**Academic Year 2020-21**

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Key words:

Aging population, birth rate, life expectancy, population pyramids, regeneration process, baby boom

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## Abstract

During the last decade, aging populations are getting to worrying points in some regions, especially in developed countries. One of these countries which has been very affected by an aging population is Spain, as it has had a very big birth rate problem, as it is one of the countries in tu EU with the lowest rate. This fact sums up with another one, which is life expectancy (increased vastly in the last decades in Spain), which leads to disaster, as they are two phenomenons that, succeeded at the same time, take us to an unsustainable economy. In this project we will focus on the Spanish region of the Balearic Island. The archipelago has surprisingly good ratios, in terms of aging population, compared to many other regions in Spain, however this doesn't take away the fact that Baleares is in a critical point, as all it's fellow Spanish regions. The main sources come from the same points as the general Spanish issues: low birth rate, high life expectancy and also immigration, which leads to an increase in the middle sector of population pyramids, which are already too big to sustain due to the *baby boom* generation. All these problems are just add ons to issues that create, as said, unsustainability in terms of economic systems.

Our main results on the analysis conclude what we've just said; an aging population is unsustainable, especially in Spain, and as we will see, this might have a negative effect on some macroeconomic factors such as employment and unemployment, GDP, etc.

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# 1. Introduction

## 1.1. Background

Over the years, the world has experienced an increasing trend in population. If we check statistics, we will easily observe this rise, especially trough the middle years of the 1900s, as every year the growth compared to the previous year keept getting bigger, that is to say, the growth rate of each year increased in very big percentages in the 1900s. The last few years this growth rate has dropped, but this doesn't mean that growth has stopped, so the following years will be preceded by even more people in the world. All this might make us think that there are so many people because there are more and more babies, but the main reason is the complete opposite, people are getting older and living longer. The reason being is mainly because humanity learns more as years go by about human bodies and how they work; diets, health and care systems, investigation with diseases that were mortal before and now are very easily cured, people are more aware of what is healthy and what isn't for them, etc.
This is a very big concern and problem for the economic systems, as older people are harder to maintain, as they aren't able to work, and they have the right to earn pensions and state aid. Therefore, this is the main topic we'll be discussing; how is this aging population affecting our economic system as a whole, as we will be seeing what macroeconomic factors are affected by it. Mostly we will focus on it in a specific region, the Balearic Islands.

## 1.2. Why this topic?

The well-known "*baby boom*" and the concept of "inverted population pyramid" has always been a topic which has had a lot of talk and has always drawn my attention to certain extent.
Nevertheless, as this generation might have had a good effect when they were young and in active population age (as the population pyramid had the right shape), it's getting to a point where economists must take action, because the mentioned generation is getting to retiring age, which is going to be where the problem starts, and the longer they leave it, the more people from this generation is going to leave the active population sector and enter their retirement, and this will lead to cause even more devastating effects.
The reason for choosing to specify in the Balearic Islands region is due to the vast amount of articles based on the spanish problem as a whole, but none that specify deeply in regions.

## 1.3. Aim

Therefore, this is the main topic we'll be discussing; how is this aging population affecting our economic system as a whole? To do so, we will observe what macroeconomic factors are affected by it. I will, again, mostly focus on it in a specific region, as the intention of this project will be to dive deeper in investigation and find data from the Balearic region and analyze its data.

Although, in order to do so, I'll have to break down and introduce the scenario. For instance, we'll first see a brief introduction of the world situation in relation to the aging population problem, etc. And then, a little more extensively, we will be seeing Spain's situation as a nation, as we can't expect to talk about Baleares without getting some context of its own nation.

The goal will be to break down the last few years and see our background in terms of the aging population. This will already help us answer a lot of questions and guide us all the way to the present situation. As we will see, there has been a massive change in the last 30 to 40 years in different age intervals which have led to one of the main problems and "fears" of the spanish economy.


## 1.4. Method

For this study, I'll mainly focus on inductive methodology, as we will analyze a vast amount of specific data of which we are going to get some general conclusions.

Another methodology used in this project is the descriptive analysis, as a lot of the study focuses on many graphs and the description of which.

On the other hand, I'll also use the quantitative methodology due to the fact that I'll be analyzing the association and relation of different variables and magnitudes.

To do so, all the information has been researched and found in various sources such as internet web pages, online articles from different economists and their opinion, subjects which have been completed in the UIB economics degree, etc. As to the data provided, I will reference official statistic browsers such as INE, Eurostat, IBESTAT, ONU, Our World in Data, MITES, and more.

Some of the keywords that are going to be mentioned in abundance are: aging population, birth rate, life expectancy, population pyramids, regeneration process, baby boom... among others.

- *Aging population:* known to be the process of the increasing average age, due to the increase in life expectancy and the decline of fertility or birth rate in a determined region.
- *Birth rate*: the birth rate is the ratio between the number of live-born births in the year and the average total population of that year.
- *Life expectancy:* is the average ratio of the age people in a certain region reach.
- *Population pyramids*: graphical analysis about the demographic data of a country or region which is divided in age intervals and gender,and can give us an idea of how that country or region is going to evolve demographically.
- *Regeneration process*: the process where a region has started to have positive generational ratios in terms of aging, especially focusing in the upcoming generations.
- *Baby boom*: generational age gap of people born between the 1960 and 1975 where birth rate ratios peaked due to the end of world wars and civil wars.

## 2.    Aging population, already a reality in Spain

### 2. 1. Current world situation

#### 2.1.1. World population increase

World population has grown dramatically over the years, especially in the past century. According to Our World in Data[1], as we can see in *Graph 1,* in 1928 there was a world population of 2 billion people, then 4 billion in 1975, 6 billion in 1999, taking us all the way to the present, with almost 7,8 billion people in 2020. As we can observe in the data, this trend has a very considerable change from the beginning of the 20th century to the beginning of the 21st century, despite having an obvious declining trend the last few years, as the growth isn't as vast as in the middle years of the 1900s, the future estimates are that the world population is to keep growing but, still, with a declining growth rate, as this growth keeps slowing down. According to worldometers.info[2], the world population forecast is to reach up to just over 9,7 billion in 2050.

**Graph 1. World population 1928-2050**
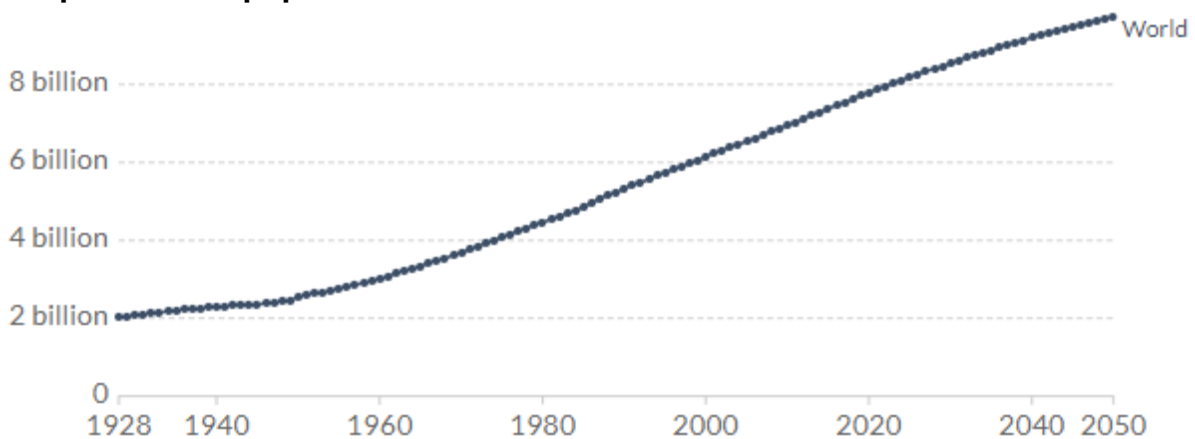


*Graph 1. Source: Gapminder, HYDE (2016) and United Nations Population Division (2019). Our World in Data.*

So the question is, why has the world population grown so much in the last 100 years? Why has this growth rate decreased in the last few years?
As mentioned in the introduction, this large population increase is followed very closely by the evolution in many different areas, for example: technology, health, medicine, etc. Humans have found a way of learning a lot and very fast in the last years about how us humans work and what is the best way to live a long and healthy lifestyle.

#### 2.1.2. Other important facts

Therefore, the effect that this knowledge has provided is a growth in life expectancy. Checking Our World in Data again, we'll find that the average life expectancy worldwide in 1900 was 32 years of age, fast forward 50 years and in 1950 that number had gone up to 45,7 years old. Another 50 years take us to 2000 where the age was 66,3, up to the latest data recorded, which is in 2019

and the life expectancy worldwide is all the way up to 72,6. Again the trend shows a large increase in the 1900s and keeps growing but at a smaller rate.

According to epdata[3], in 2018, for the first time ever, the population of 65 year olds and above surpassed the population of kids under the age of 5 in the world. The reason is not only the population getting older, but also the low amount of births there has been in the last 20 years compared to before, as birth rate has seen a drastic change and decrease.

Consequently, here is where our controversial topic comes in; the aging population. What is going to happen if the world keeps getting older (as life expectancy isn't giving any sign of decreasing) and birth rate keeps lowering? We have been building and accumulating the perfect characteristics for a disaster, which has been starting to happen in some countries, dominantly in the developed ones, where the concept of *inverted pyramid,* which will be explained further on, is becoming a major reality.

## 2. 2. Europe analysis

### 2.2.1. Past, present and future of population in the EU

The population in the European Union has had a similar trend to the whole world population, with a significant increase in the 1900s. As we can observe in *Graph 2,* Europe's population has grown, in particular in the late 90s more than in the early 2000s, the reason is the same as the world's population; rates are slowing down worldwide mainly because of birth rate decrease.

In 1960 the EU had a population of just over 354 million people, while in 1990 there was 418 million people. Another 30 years on, the population is 447 million in 2020. Here we can see a better visual reference of the reduction of growth, as in the first 30 years (1960-1990) the EU population increased 64 million, while the second 30 years (1990-2000) it increased 29 million, less than half of the first 30 years.

The countries in the EU with the most population are Germany (83,2 million), France (67,1 million), Italy (60,2 million) and Spain (47,3 million). Only these four countries represent 57,7% of the actual total EU population.

**Graph 2. Total population in the European Union from 1960 to 2019.**
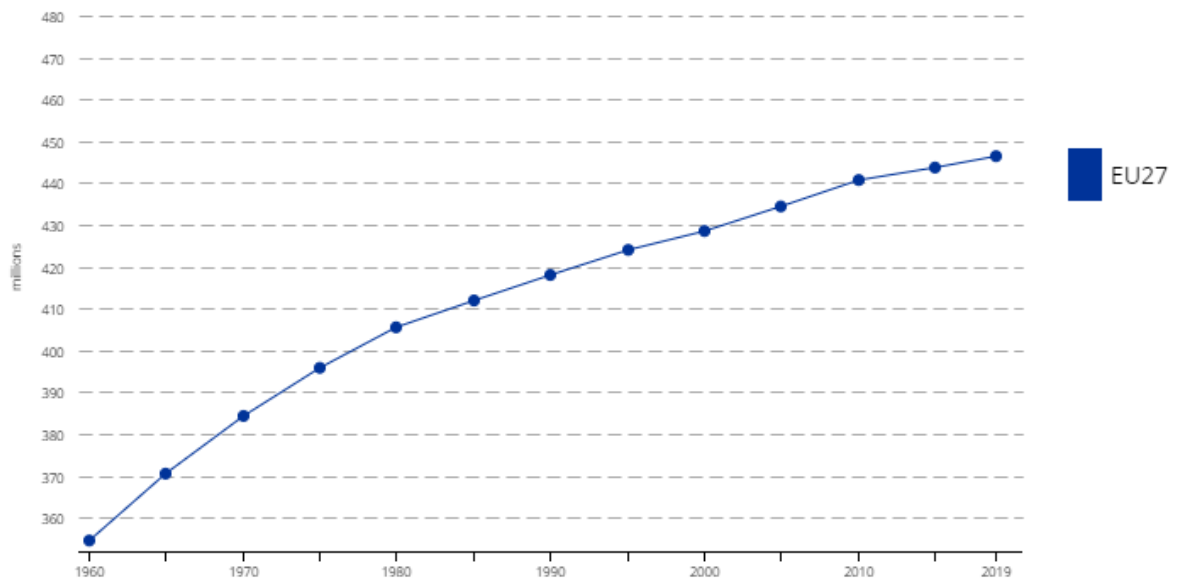


*Graph 2. Source: eurostat*

Something that stands out a lot is the expectancy for the EU population in the future, as experts expect the population in the EU to start dropping from 2030 onwards. As we can appreciate in *Graph 3,* we would peak in population in 2030 with about 450 million people, so almost the same as now, the projection is that the next 10 years population won't vary too much. From 2030 as we can observe, population will expectedly drop until 2100 approximately, down to 416 million people. This is just under the population we had in 1990.

This is very interesting as we have seen that world population will slow its growth process considerably, but it will continue to grow. But in this case, the population will drop.

The main reason as stated before, is fertility rate and the big decrease that it has been having since 1980 approximately and will just go lower and lower, which we will see next on.

**Graph 3. EU population expectancy until 2100.**
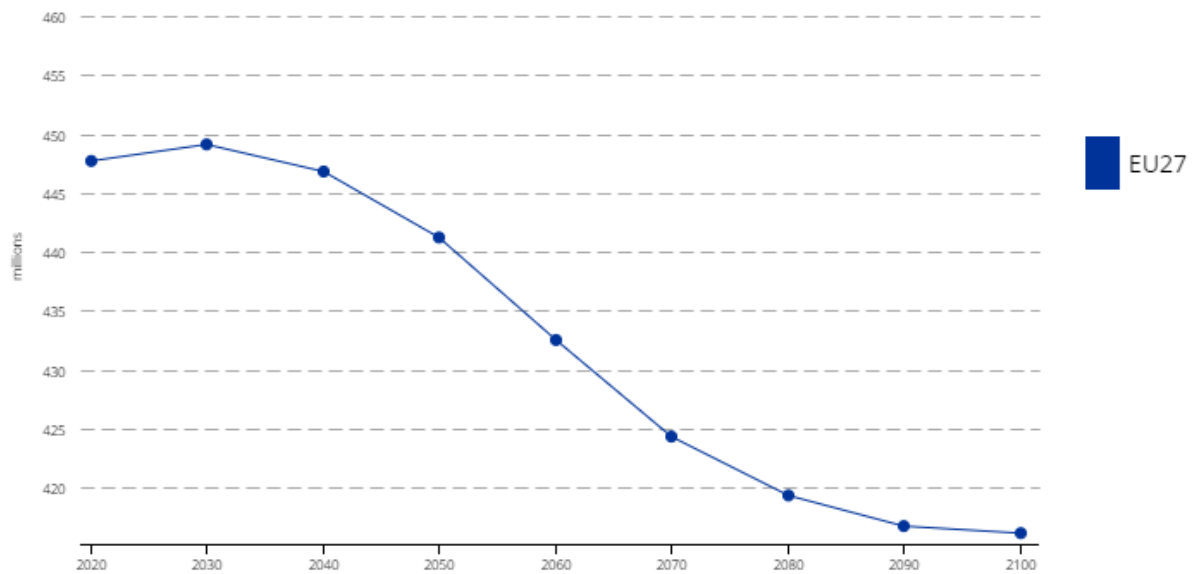


*Graph 3. Source: Eurostat.*

### 2.2.2. Birth rate in the EU

Birth rate is what, mainly, is causing the growth rate to decrease these last years. In the EU this is no exception. In *Graph 4* we have the actual birth rates in all the EU countries. These have all decreased considerably in the last years, getting to very low points 15 to 20 years ago. These numbers have recovered a little bit since then, but they are still very low as we can see.

Countries with the highest birth rate are France (1,87 average kids for each woman) and Sweden and Romania with 1,76 average kids for each woman. In the low part of the graph we have Malta (1,23), Spain (which we'll talk about more deeply further on, with 1,26) and Italy (1,29).

**Graph 4. Fertility rate in the EU**
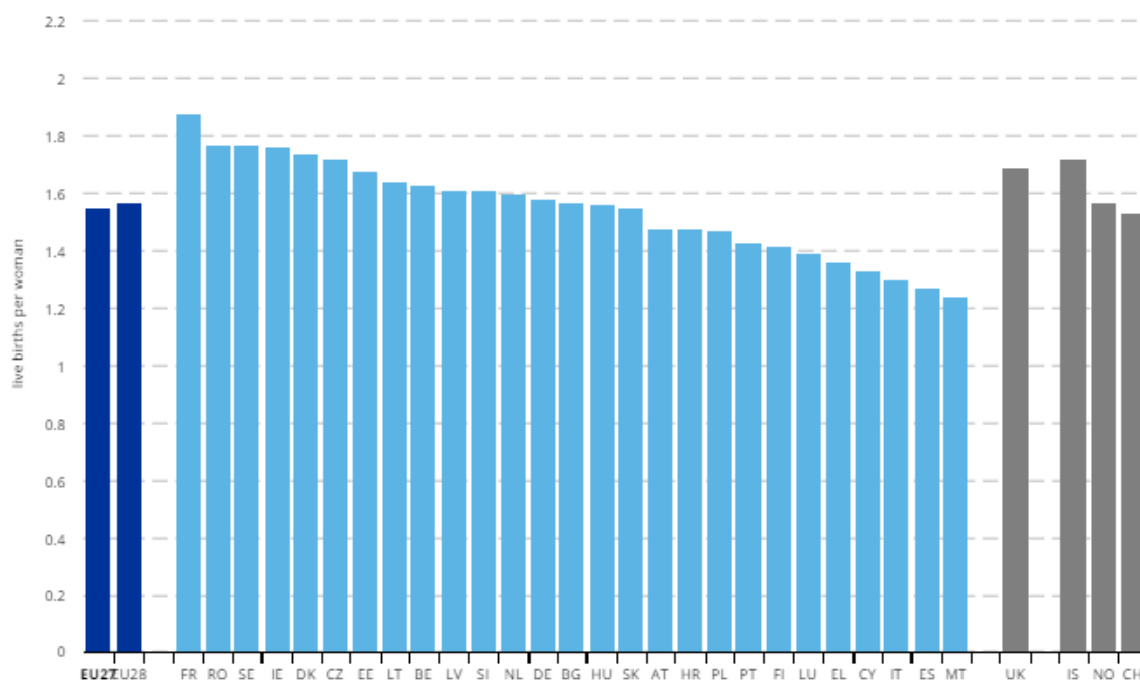


*Graph 4. Source: eurostat*

## 2.3. Spain's situation

### 2.3.1. Spain's aging rate

As we start to get closer to our main focus, the Balearic Islands, the next step is to specify a little more and analyze the nation which our region is situated, to see where we are at and what we can expect from Baleares.

To analyze if a country has an aging population problem, it's common to use what we call the aging *rate,* this is, the percentage of 65 year olds and above there is in the population of a certain region as a whole.

In Spain, the aging rate has gone from 11,2% in 1980 to 19,2% in 2018. That just shows a country which is getting older. This aging is due to many factors which are mentioned in the following segment, as the aging rate is very strongly correlated to life expectancy. If life expectancy of a country or region rises, it's clear to say that their aging rate is also on the up.

### 2.3.2. Life expectancy in Spain

One of the most outstanding and, maybe, surprising facts is that Spain is one of the countries with one of the highest life expectancy in the world.

As we can observe on *Table 1*, we have compared Spain to other countries which, on paper, are reasonably on the same level or even more developed. By general knowledge, there is a positive correlation between developed countries and life expectancy, therefore, as we know, Europe has the highest life expectancy of all continents, while Africa has the lowest of them. That's why it's

surprising to see Spain (83.36) have higher life expectancy compared to, for example, Germany (81.1), Sweden (82.57), Denmark (80.68) or Canada (82.22). So, if the countries mentioned before are more developed and advanced than Spain in a vast amount of areas; what makes them have a lower life expectancy than Spain? Many articles talk about the mediterranian diet and the healthy lifestyle in the regions in the south of Europe. As shown in *Table 1*, Italy, a very similar diet to Spain's one, has a very high life expectancy too. Japan, the world pioniers in life expectancy, also has a very healthy diet, based mainly on seafood and rice, which makes us realise that diet is a very important variable in life expectancy. Without forgetting, obviously about national health and service in these different countries, which are the reason why people have stopped dying due to illnesses that were mortal just a few years back, in the 20th century, and now are easily curable.

**Table 1. Life expectancy in developed countries during 2015-2020.**

| Country or Area | Value |
|---|---|
| Belgium | 81.39 |
| Canada | 82.22 |
| China | 76.62 |
| Denmark | 80.68 |
| France | 82.46 |
| Germany | 81.1 |
| Italy | 83.28 |
| Japan | 84.43 |
| New Zealand | 82.06 |
| Norway | 82.18 |
| Spain | 83.36 |
| Sweden | 82.57 |
| Switzerland | 83.56 |
| United Kingdom | 81.15 |
| United States of America | 78.81 |

*Table 1. Source: data.un.org*

As we will find in *Table 2*, the United Nations have estimated some data of what life expectancy is going to look like between the years 2045 and 2050. As we keep remarking, the population is aging and this is no secret. In the following data we can see that in about 20 to 30 years' time, each and every countries' life expectancy will go up about 4 or 5 years on average, and if we are referring to life expectation that is a very large increase, which, with no reaction, will take the world straight to disaster.

**Table 2. Predicted life expectancy in developed countries (2045-2050).**

| Country or Area | Value |
|---|---|
| Belgium | 85.54 |
| Canada | 86.19 |
| China | 81.52 |
| Denmark | 84.85 |
| France | 86.23 |
| Germany | 85.26 |
| Italy | 87.03 |
| Japan | 87.94 |
| New Zealand | 86.05 |
| Norway | 86.05 |
| Spain | 87 |
| Sweden | 86.41 |
| Switzerland | 87.19 |
| United Kingdom | 85.26 |
| United States of America | 83.11 |

*Table 2. Source: data.un.org*

### 2.3.3. The declining birth rate in Spain

Another fact to point out is birth rate. If we check *graph 5*, in Spain, between the years 1960-1975, the birth rate ranged on average between 2,8 and 3 kids per woman, which was the baby boom era. Since 1975, the birth rate began to decrease year by year all the way to 1998, where it reach its lowest, 1,13 kids per woman on average, which is the prime example of why Spain's population pyramid is the was it is and has such a narrow gap where we find people that were born in the 90s (so in present, people that are 20 to 30 years old). After that we can follow the graph and see a slight upwards trend during the period 1999-2008, which, not coincidentally, matches the agreement of the entry of the euro in Europe, which led to years of economic expansion and wellness in countries like Spain, because there currency had to equal other european countries which where in better positions, so the *peseta* appreciated its value, as seen in the optional subject of European Economics. This lasted up to the latest big crisis, originated in 2008. The upcoming years were years of deep crisis which led to another downfall in birth rate, leading to 2013, where birth rate was 1,27. The last year's birth rate has stabilized at about 1.34 kids per woman. Another main reason which birth rate has been affected since 1975 onwards is the fact that the percentage of women entering labour market has increased. This leads to less housewifes, which meant less timeat home to spend with kids, resulting in a strong decrease in birth rate. Looking at INE stats, we can see that in 1978, 28,1% of women were in labour force, while in 2018 there is a female workforce of 53,1%.

**Graph 5. Birth rate in Spain from 1960-2017**
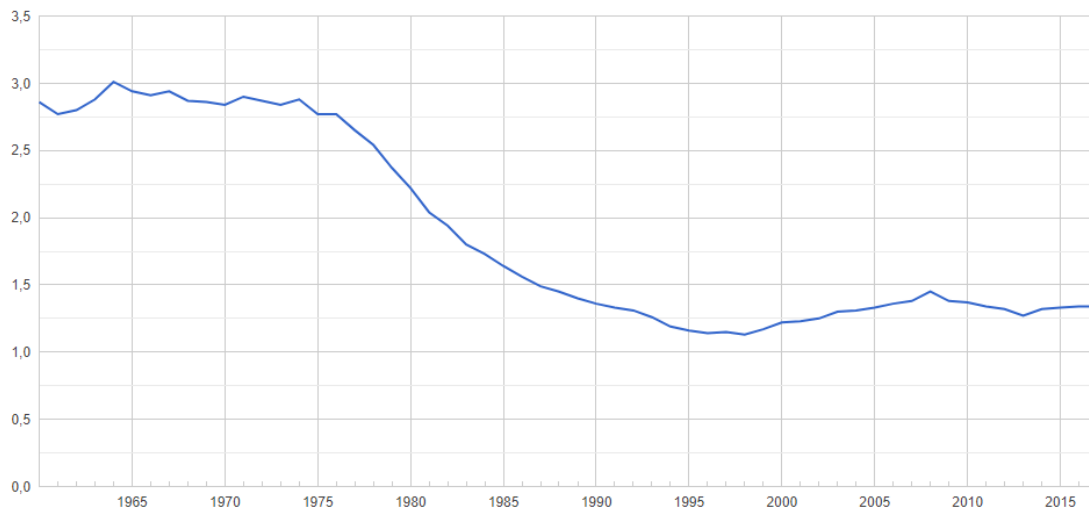


*Graph 5. Source: Banco Mundial*

If we analyze the last 20 years, from the years 2000 approximately, we can see, we observe another correlation, this time between economic expansion and birth rate. When things are well economically, we'll observe that people are more likely to have kids. Whereas, when we are in eras of crisis, birth rate will drop, as kids suppose a big expenditure not many families are willing to pay in certain periods like the ones mentioned. This is, approximately year 2000: entry of the Euro in Spain. 2008: financial crisis.

Going back to INE and their article, they state that the birth rate will very slowly begin to rise again once we reach 2023, and by 2033 reach 1,41 kids per woman in Spain.

Sadly, observing statistics and population pyramids, we can see that this "base" of the pyramid won't be enough to support the weight of the elderly people, which as we've seen, is increasing at a much higher rate.

### 2.3.4. What are inverted population pyramids?

As said in point 1.4., population pyramids are graphical analysis about the demographic data of a country or region which is divided in age intervals and gender, and can give us an idea of how that country or region is going to evolve demographically speaking.
A progressive population pyramid should look like the graph on the left in *Graph 6*, where we have a population with a base, which would represent the kids and the birth rate there is in that country, which shouldn't be very. A middle sector, which is the middle age people, working age population, which as shown should be the widest bit of the pyramid, and lastly, a reasonable peak of the pyramid.

**Graph 6. Progressive and inefficient examples of population pyramids**
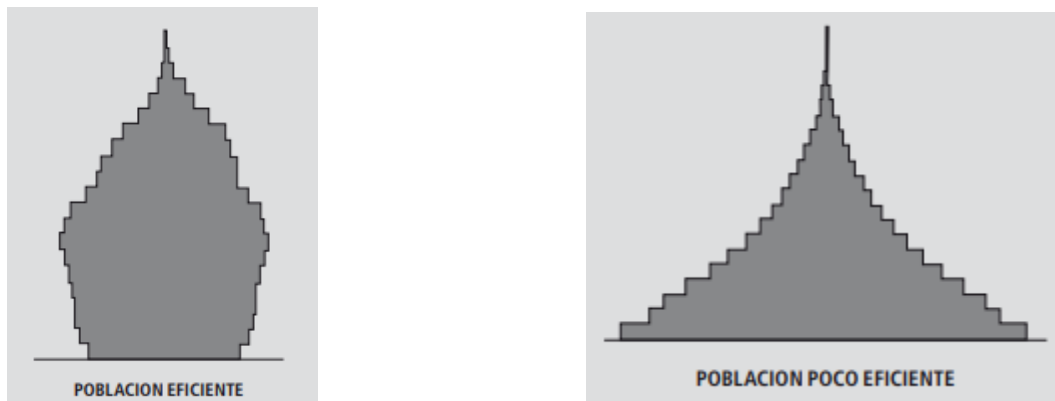


*Graph 6. Source:* Julio Pérez Díaz (noviembre, 2010). La revolución reproductiva. *El envejecimiento de la población española*, 39. Recovered from
https://digital.csic.es/bitstream/10261/29071/1/2010Inv+Ciencia.pdf

Secondly, if we check the graph on the right in *Graph 6*, we will observe what an inefficient pyramid looks like, where there is a birth rate which is too high, and a working age population which is too low.

### 2.3.5. Spain's population pyramids

In *Graph 7*, we can observe Spain's case throughout the interval of 1975 to 2010, 35 years. In the left graph we can observe the pyramid in 1975, where, as mentioned in the graph itself, we can observe a reduction in the middle of the graph because of the deaths caused by the civil war. Also, during the late 60s, the baby boom happened, which reveals itself in the 1975 graph with a very big base, as we have just seen, the birth rate in this case was too high, inefficient. We can also see that the retirement age population, the aging rate, only represents a 10% of the country's population.

35 years forward and we see the evolution on the graph, the main problem: as the baby boom created a very high birth rate, that birth rate was too hard to maintain. Moreover, it reduced to percentages not seen for years and years, not to say in history. The graph shows that in 2010 the 3rd age population increased to be a 17% of the population, showing also that people lived longer.

**Graph 7. Spain's population pyramids in 1975 and 2010**



Graph 7. Source:Julio Pérez Díaz (noviembre, 2010). La nueva pirámide poblacional. *El envejecimiento de la población española*, 36. Recovered from
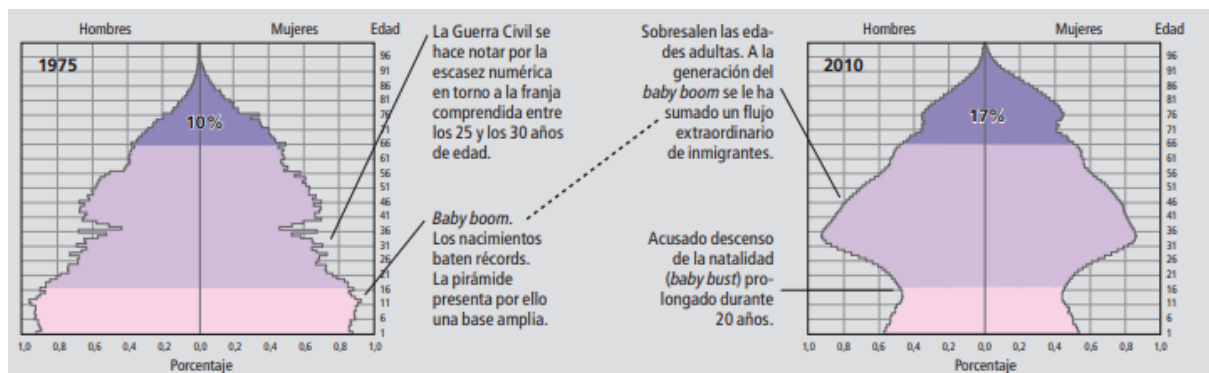*https://digital.csic.es/bitstream/10261/29071/1/2010Inv+Ciencia.pdf*

Another kind of inefficient pyramid is Spain's example, which is known as inverted. Why? Because, as we can see in *Graph 8*, if we first focus on the orange graph, which is representing 2018, we can see that the pyramid is evolving with no change, for instance, the top is getting wider, and the base, which is the part where we should see a reaction, is getting even smaller, which is a big problem for future.

As shown in the same graph, the green colour is an estimation for 2033, where, if nothing changes, which the estimations don't suggest it (furthermore the birth rate is shown to reduce even more), Spain will be in the danger zone, as the baby boom generation will enter retirement age and there will be no room for improvising or to maneuver. And, as said by Mestres Domenech (2018)*:*

> *"[...] the dependency ratio –the proportion of the population over 65 with respect to the working-age population–, will increase from 2018 to 2033 very considerably in Spain (from 29.6% to 40.7%)".*

Which can lead to very drastic economic problems and crises.

# Graph 8. Population pyramid in Spain (2018 and 2033)
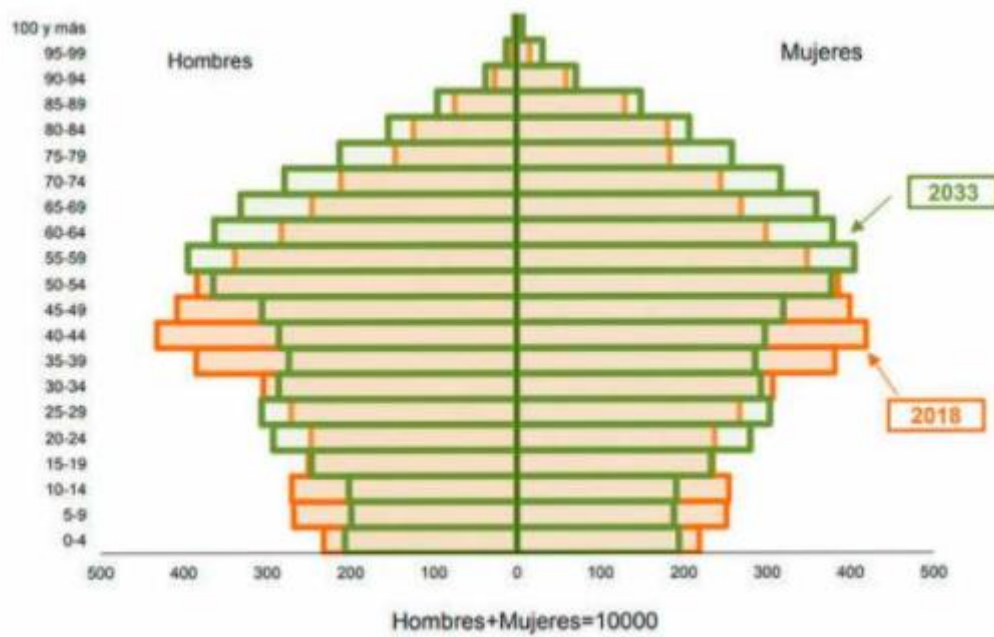


*Graph 8. Source: INE. En 2033 habrá 49 millones de habitantes en España y uno de cada cuatro será mayor de 65 años. (*10/10/2018). Recovered from https://www.ine.es/prensa/pp_2018_2068.pdf

# 3.    Aging population in Baleares

## 3.1. All the regions in Spain

To focus on our region, the Balearic Islands, first we'll take a look at all the *autonomous communities* and see where we are placed in ranks of some data, to be able to place ourselves and see what to expect from Baleares.

To give a heads up, the Balearic Islands are one of the best regions in Spain in terms of not having too much of an aging population, we will see that there are regions much worse. Despite this, this doesn't take away the fact Baleares has an aging population, as the whole of Spain has.

### 3.1.1. Aging rates in different CCAA

As seen in the *Graph 9* and as we just said, Baleares has one of the best aging rates in Spain. Something that really stands out is that we can observe that the 3 regions with the worst aging rate in Spain, reach almost 25% of the aging rate, which means that 1 in every 4 people of Galicia, Castilla y León and Asturias are people aged 65 or over. What this affects mainly is in pensions, as there aren't enough people that are in the active population and that are paying taxes in order to fill the needs of the pensioners.

**Graph 9. Aging rate in different CCAA from 1980-2018.**
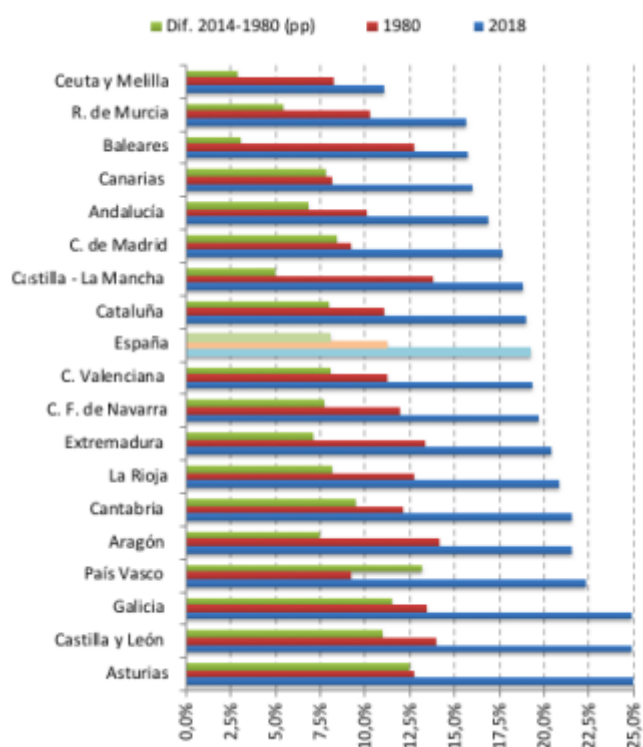


*Graph 9. Source: Las pensiones en las Comunidades Autónomas (BBVA) and INE.*

Checking, again, *Graph 9*, we see the difference between the red lines and the blue lines, 1980 and 2018. Therefore, we can talk about regions that are better off or worse off, but the reality is that, even in the Balearic region, which is in one

of the best positions in the aging rate of Spain's regions, all the regions have had a steep increase. And as seen thanks to the information that population pyramids supply, we know that the trend will be to continue with this upwards trend, or have an even more steeper increase, as the generation of *baby boom* still has to enter pensioner ages, and that's where we'll see the most damage and most difference.

### 3.1.2. Evolution of the average age in Spain's CCAA

The average age of regions is also a good tool to measure where that region is positioned averagely on paper. We already saw the way the world's average age shooted up compared to a few decades ago, but how about Spain's interior?

**Graph 10. Spain's average age in 1980 and in 2018**
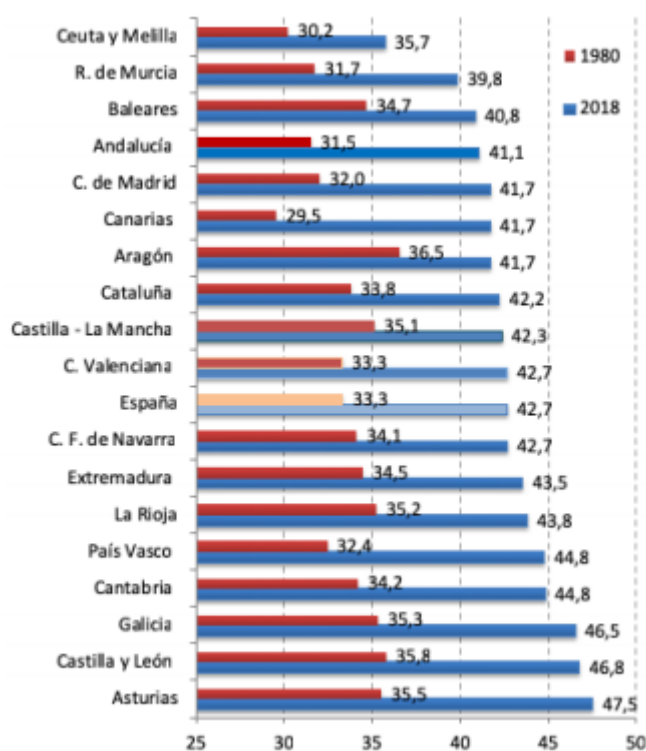


*Graph 10. Source: Las pensiones en las Comunidades Autónomas (BBVA) and INE.*

Looking at *Graph 10,* it can help us see what regions have had a good regeneration process and which ones have not. For instance, if we take the Canary Islands, we can see an example of a region that has not had a good regeneration process. Why? Because checking their average age in 1980, where they were clearly the youngest region of Spain. But advancing to the present, we can observe that, despite being on the lower side of the graph, the younger side, they are the region that has increased their average age one of the most from 1980 to 2018; 12,2 years. Just under the Basque region (12,4) which is another good example of bad generational process.

On the other hand, if we analyze Aragón, we can see the opposite side of the example. A region that in 1980 had the most eldery population has changed things around thanks to a good regeneration process, and now has an average

age which is a year lower than the Spanish one as a nation. They are the region which has increased the least since 1980, increasing only 5,2 years.

So for this example we got two regions which have the same average age at present, but thanks to the data provided we can analyze the trend, and perfectly predict which region is going to continue with their positive trend and which one with their negative trend, if they don't try and improve their generational process.

Baleares' case is more similar to Aragón's one. As we can see, in 1980 Baleares was quite above the average Spainsh age, 1,4 years above. And in 2018 we see the positive trend which leads them to be 1,9 years under the average of the whole nation. So here we have another example similar to the region of Aragón, where, as we've said, they've had a good generational process, this means; apart from aging, as all the regions have in Spain, having a "healthy" birth rate that can support that aging as far as possible.
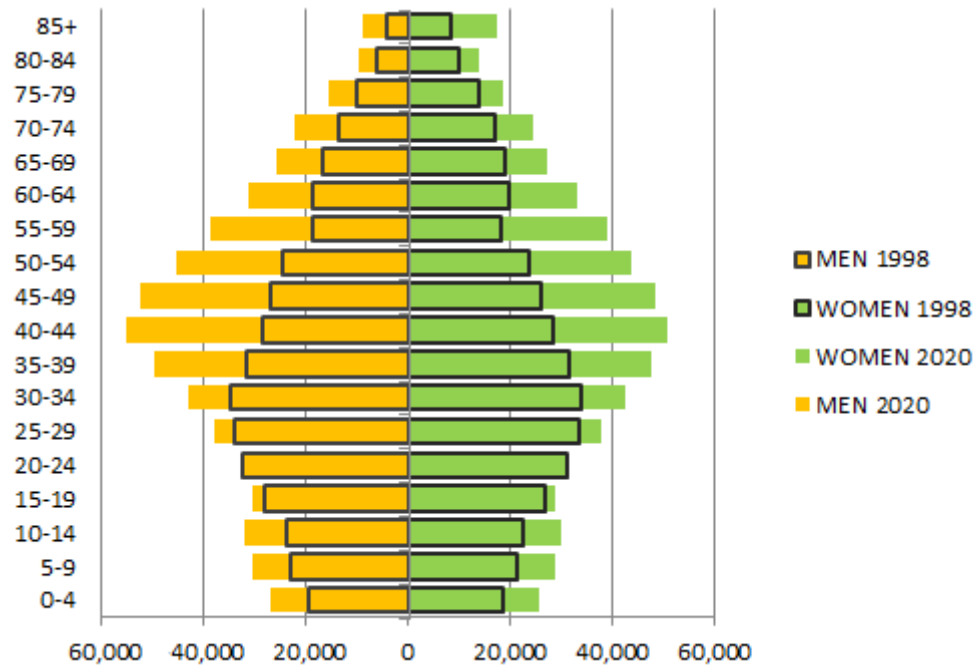

## 3. 2. Population in Baleares

The beginning of the analysis of Baleares has to start with their total population. If we see how many people live on the islands we can start to compare other data with some reference points.

### 3.2.1. Total population in Baleares

To start, we are going to have a look at the total population pyramid of the Balearic Islands. Checking *Graph 11* we can observe the 2020 pyramid which compares a lot to Spain's one: with a very wide mid-sector and a slimer base. Something to highlight is how women that are 85 years old or more, are much more predominant than men; looking at the last age interval (85+) women almost duplicate men. This is no surprise, as the last data found (2018) of life expectancy for men in Baleares is 80,78, while for women, it's 85,67. Almost 5 years of difference, when referring to life expectancy, is a very considerable gap. Therefore the joint life expectancy comes to 83,23 in the Balearic Islands in 2018.

In the same graph we can also find the 1998 population pyramid for the total population in Baleares, as we know, the birth rate was at its lowest in Spain in 1998, we can see it's effect, which is one of the reasons we have the actual pyramid problem. The 1998 pyramid had a much more progressive form and shape than the actual one. This is why the problem was caused by birth rate in 1998, if that birth rate would have been larger, today's pyramid would be more progressive. However, the *baby boom* was, as we know, the main originator of the problem. As we can observe, in the 1998 pyramid we see that the widest group is found in the 25-35 age intervals, the same ones that 22 years later are found in the 2020 pyramid in the 40-50 age intervals. As we can see following the trend, this wide group, which is the *baby boom,* will continue to move up, which is where the problem will start to originate, as we continue to repeat; in 15 years more, when this age group reaches retirement age.

**Graph 11. Total population pyramid comparison in Baleares from 1998 and 2020**



*Graph 11. Source: own elaboration from the data of INE*

### 3.2.2. Dividing the Balearic population in Spanish and foreing.

Looking at *Table 3* we can see the number of total populations on the left, from 1998 to 2019. In Baleares we have seen an increase coming from years back, all the way to a peak in 2012, where we start seeing a downfall probably due to the decrease in birth rate we saw because of the crisis that started in 2008. The population growth stopped for two years where it decreased to a total of almost 16.000 people. After this little decrease, it kept it's increasing trend and has grown since then, reaching almost 1,150.000 people in the islands in 2019. A total growth of around 350.000 people in 21 years. This increase of 350.000 equals 43.75% of the population there was in 1998.

**Table 3. Total population in Baleares. Spanish and foreing distribution.**

| | BALEARIC ISLANDS | | |
|---|---|---|---|
| | **TOTAL POPULATION** | **SPANISH POPULATION** | **FOREING POPULATION** |
| **1998** | 796.483 | 758.247 | 38.236 |
| **1999** | 821.820 | 776.776 | 45.054 |
| **2000** | 845.630 | 790.871 | 54.749 |
| **2001** | 878.627 | 804.744 | 73.883 |
| **2002** | 916.968 | 817.224 | 99.744 |
| **2003** | 947.361 | 820.856 | 126.505 |
| **2004** | 955.045 | 823.662 | 131.423 |
| **2005** | 983.131 | 826.861 | 156.270 |
| **2006** | 1,001.062 | 833.311 | 167.751 |
| **2007** | 1,030.650 | 840.480 | 190.170 |
| **2008** | 1,072.844 | 849.808 | 223.036 |
| **2009** | 1,095.426 | 857.864 | 237.562 |
| **2010** | 1,106.049 | 863.793 | 242.256 |
| **2011** | 1,113.114 | 870.302 | 242.812 |
| **2012** | 1,119.439 | 876.869 | 242.570 |
| **2013** | 1,111.674 | 887.268 | 224.406 |
| **2014** | 1,103.442 | 900.330 | 203.112 |
| **2015** | 1,104.479 | 911.961 | 192.518 |
| **2016** | 1,107.220 | 918.324 | 188.896 |
| **2017** | 1,115.999 | 929.066 | 186.933 |
| **2018** | 1,128.908 | 936.047 | 192.861 |
| **2019** | 1,149.460 | 944.473 | 204.987 |

*Table 3. Source: own elaboration from the data of IBESTAT*

Another fact to highlight is that the foreing population that immigrate to the island are also an important source of increasing population. As these immigrants usually come at an adult age and make the pyramid wider at the middle sector. This has pros and cons, as the positives are that they already come at an age where they pay taxes which helps paying pensions, etc. A bad point of view would be that the pyramid does't follow it's natural flow, as it just widens in the middle sector, as said, and doesn't grow a big base of the pyramid as birth rate isn't affected   On the other hand, they also arrive at an age where they are likely to have kids, which makes the birth rate go up.

Following *Table 3,* in 1998 we see that the number of foreing people living in the islands was only just above 38.000, which represented, at the time, 4,8% of the population in Baleares. Meanwhile in 2011, where the number of immigrants peaked, they represented 21,81% of the population, this means that 1 of every 5 people in the archipelago was foreing. Currently, as the total population of Baleares has gone down compared to 2011, and the total number of foreign people in the islands has decreased, they represent 17,83% of their population.

A good way to see the effect of the foreing population, and the problem I just mentioned about the age at when they immigrate, etc. is looking at population pyramids from Spanish population in the Balearic Islands, and from foreing population in the Balearic Islands.

First up we have *Graph 12*, where we see only the local population, people that were born in Baleares. As shown, the pyramid is very similar to the total population (as the main source of the total population is Spanish), but we can see that the *baby boom* group is much less pronounced, which would make a big difference, as this pyramid is a much more pregressive and "healthy".

There is not much more to say about this pyramid as, as said, it's pretty much identical to the total population one apart from the slimming bit in the middle sector. And with the 1998 pyramid is the same breakdown.

**Graph 12. Spanish population pyramid comparison in Baleares from 1998 and 2020**
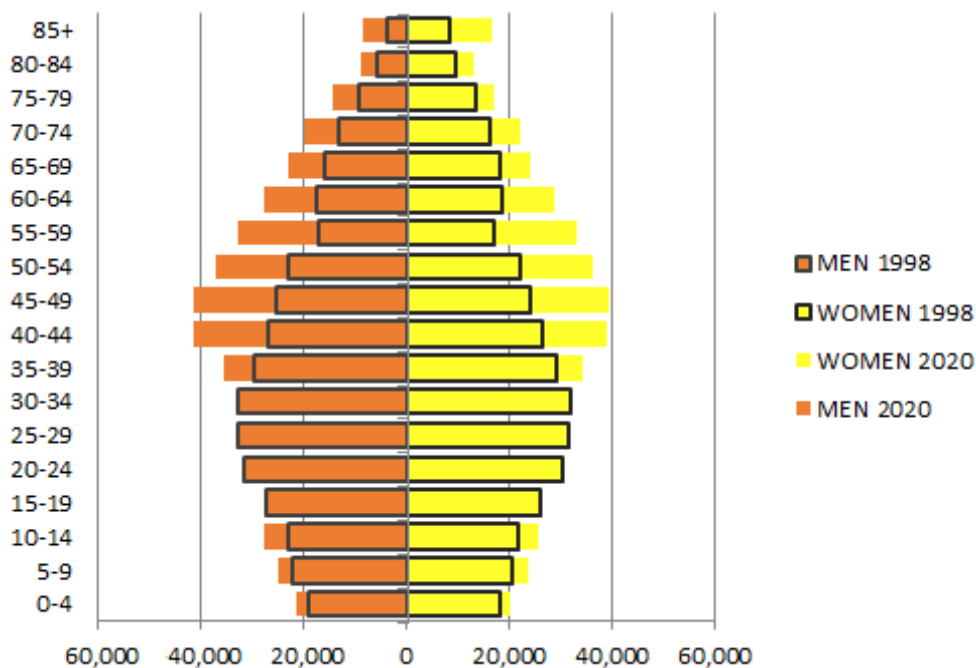


*Graph 12. Source: own elaboration from the data of INE*

The big visual information we can observe thanks to these pyramids comes in in *Graph 13*, where we have the population pyramid of foreing people that have immigrated to Baleares.

In the following graph we can see, first of all, a very noticeable difference in 1998 and 2020. In 1998 there was almost no foreing population in the islands, it was mainly just local residents. Meanwhile, in 2020 this number is much higher in all sectors. As mentioned, one of the problems of having a population in which almost 1 in every 5 people are foreing is that these people immigrate to the islands in adult ages mainly, which only widens the middle sector of the pyramid. In *Graph 13* we see that very clearly.

This has positive and negative effects. Usually these immigrants come in search of jobs (which is the reason why adult age intervals are higher), which makes the state and government receive more tax money; a big positive, as this helps pay pensioners' pension, for example. The problem comes if they stay here in the

islands to retire which will make the *baby boom* sector, which is already very big, become even bigger, and add to the problem that will come in future years when they reach retirement.

**Graph 13. Foreing population pyramid comparison in Baleares from 1998 and 2020**
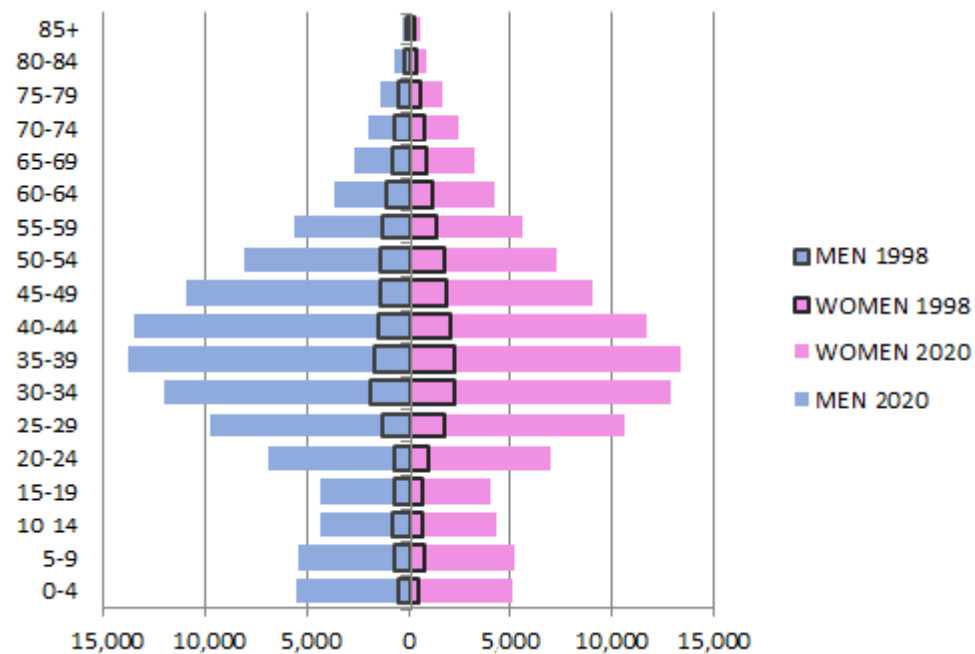


*Graph 13. Source: own elaboration from the data of INE*

## 4. How does the aging population affect the Balearic economic system?

### 4.1. Effect on employment

As we have been commenting, as the population gets older and the *baby boomers* get to retirement age, it will produce a big shock in the economy as the percentage of people in active age (16-64 year olds) will get smaller, this sums up, as a result, in less workers.

As Mestres Domenech (2018) said in his article *El envejecimiento de la población española y su impacto macroeconómico;* every age group shows different attitudes towards different aspects such as labour market participation, consumer patterns, etc. Therefore, every difference, increase or decrease in each age group can change a region's economy significantly.

If we look at *Table 4* we can see the way the total Balearic population is divided; the difference between total population is about 300 thousand, while the population in active age difference is only roughly 150 thousand. This shows the decrease, in percentage, that the population is suffering. This can also be seen clearer if we check the under 16 population, which has only grown 28 thousand people, while the over 64 population has grown almost 60 thousand, more than double the under 16 population growth. The 3rd age people have also surpassed the under 16 kids for the first time in history, basically. Future expectations are that the population will maintain the level for a couple of years, while the 65 and above population will rise significantly.

As we were explaining before, this inevitably means that every time there are less workers, and in the future, when the *baby boom* generation enters retirement age, even less. We also have to address the fact of unemployment rate, which shows us that the percentage of active population is even lower than what we just mentioned, in recent years than in the past, due to the big increase in unemployment rate as shown in *Table 4*, from just 6,50% in 2006 to 16,23% in 2020.

**Table 4. Population in active in Baleares**

|  | 2020 | 2006 |
|---|---|---|
| **Total population** | 1.211,10 | 981,2 |
| **Under 16** | 188,7 | 160,6 |
| **16 to 64 year olds** | 830,7 | 688,7 |
| **65 and above** | 191,7 | 132 |

*Units: thousands of people*

*Table 4. Source: own elaboration from the data of INE*

As we were explaining before, this inevitably means that every time there are less workers, and in the future, when the *baby boom* generation enters retirement age, even less. We also have to address the fact of unemployment rate, which shows us that the percentage of active population is even lower than what we just mentioned, in recent years than in the past, due to the big increase in unemployment rate as shown in *Graph 15*, from just 4,72% in the 3rd trismester of 2006 to, for example, 13,28% in the 3rd trismester of 2020. Obviously this is not the only reason why unemployment has increased in the past years, as in 2008 the world was shocked by a great big financial crisis that affected worldwide. And also the last data, from 2020, can aslo have a spike due to the coronavirus crisis that has also recently struck the world.

**Graph 14. Active population divided into Men and Women**
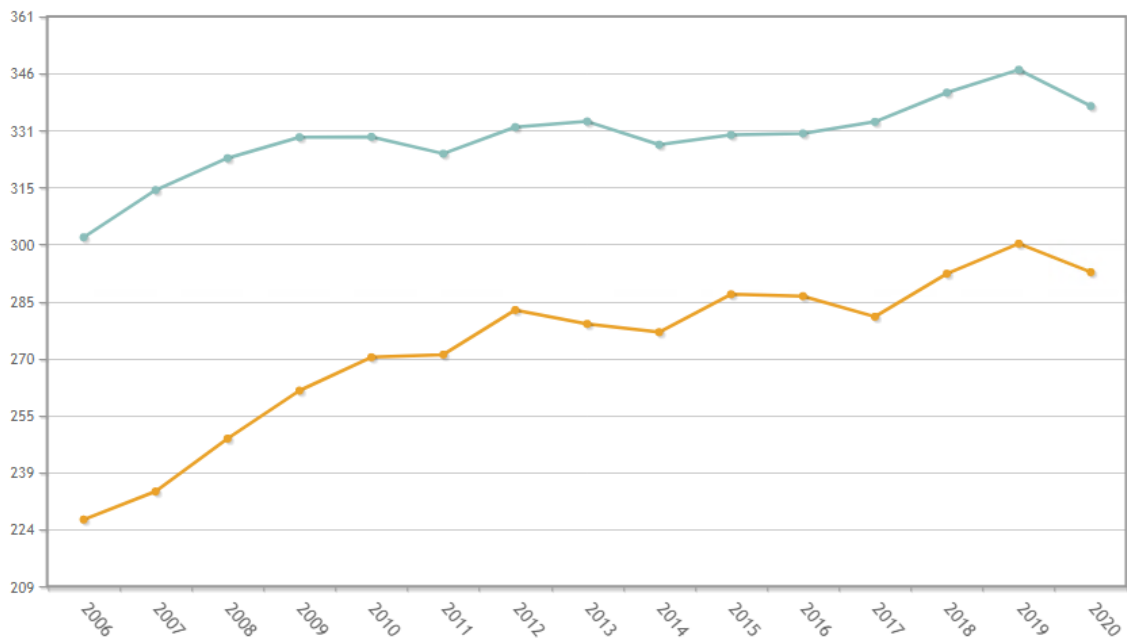


*Graph 14. Source: INE*                                   *(Men in blue, women in yellow)*

Something else to point out is that as we are analyzing the Balearic Islands, we will find a trend depending on the trimester that we look at. For instance, if we look at the first trimesters we can observe higher unemployment rates, as they are set in off-season in terms of tourism. And the opposite if we analyze the third trimesters, we will have lower rates as more people get jobs in the tourism sector (hotels, restaurants, bars, etc.).

**Graph 15. Unemployment rate in Baleares from 2006 to 2020**
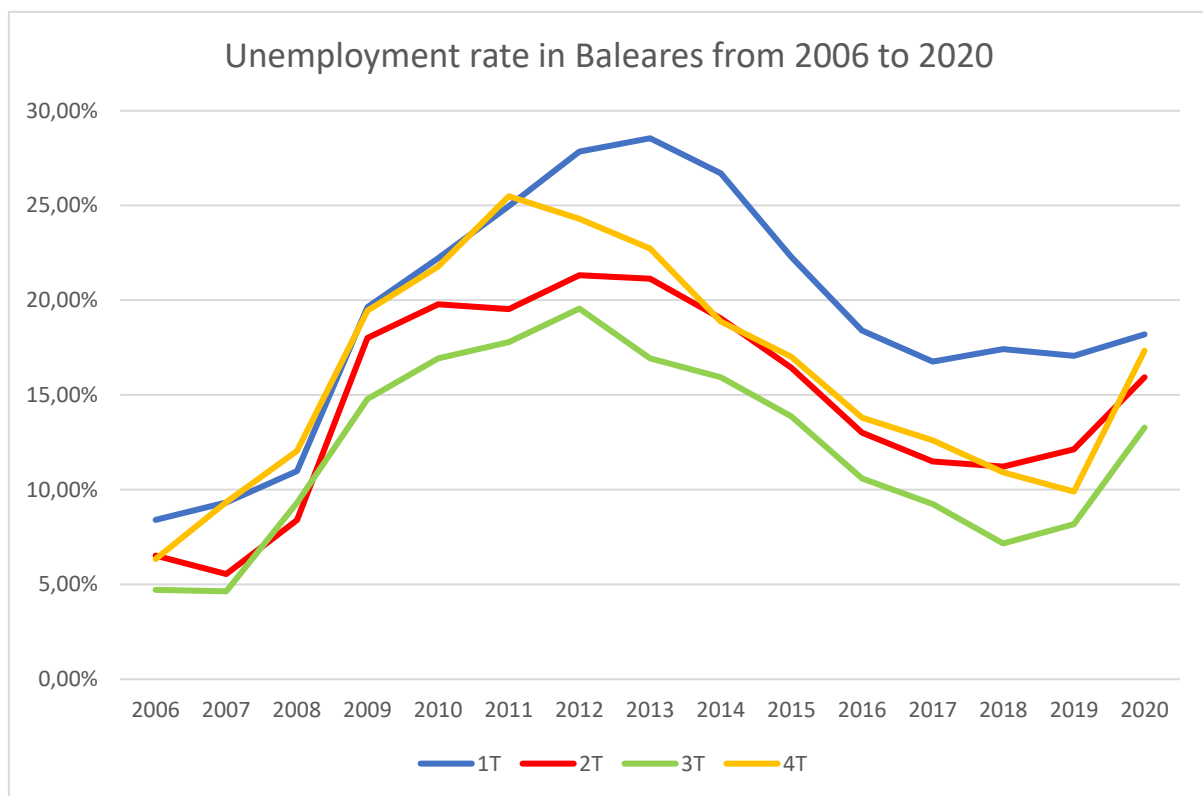


*Graph 15. Source: own elaboration from the data of INE*

In conclusion, this reflects that every time there are less workers as a whole, and this will affect the economy massively, which it already has, but as we have mentioned, it will only get worse and worse. Although, as said, the unemployment rate is only lightly affected by aging populations, especially in this case, as we have mentioned crisis and other reasons that have bigger effects on it. Nevertheless, it's also a good tool from which to analyze the effect.

Having less people in active age of working and less workers affects the economy in the sense that one of the main sources of income for the state is the personal income tax from workers, social security contributions, corporate tax, etc.

Also, as said by Lim Rogers, Toder, and Jones (2000), *p. 2:*

> *"A decline in the share of workers in the population means that, if all else remains the same, output per capita and living standards will be lower than they otherwise would have been if the share of workers had remained stable."*

Another topic that is talked about in the article is the problem of savings. As people have longer life expectancies, they also want to have more savings, especially seeing how pensions are going to be a problem, or are starting to be a problem. Savings are good for future expenditure, but the problem is the present, as with people creating savings in mass, the consumption lowers, which creates a very big problem in the economy, no consumption stopes everything in

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an economy, which is another reason why if governments show calmness to the population by reconstructing and having good retirement pension plans, population reaching retirement age won't worry so much about having to have savings due to the lack of income they will have in a near future, and they will consume more.

However, it's uncertain as if unemployment rate is reduced or increased by an aging population. On one hand, as said by Troha Akanni (2015)*: the Case of Slovenia*, older people have incentives to have a long-term contract or permanent contracts, while young people, as they start their labor career, have changing jobs and are usually given non-fixed contracts. Therefore, this indicates that an aging society or population leads to a decrease in unemployment rate, as there will be, supposedly, more people with permanent contracts. Another fact to highlight is that economic recessions also affect more unemployment in the young population than in the old population, which sums to the mentioned before.

On the other hand, young people might have more unstable jobs, but tend to find jobs more easily, for instance, a young person can have 3 or 4 different jobs in a year, while older population usually have only 1 job per year, and if they lose that job it's much harder for them to find other alternatives. This is also because businesses preferring to hire young people because they can offer a lot of years in the company and also will accept a lower salary, meanwhile older people have less years to reach retirement age and also have higher expectancies in terms of salary.

**Table 5. GDP in Baleares from 2000 to 2018.**

| Year | GDP |
|------|-----|
| 2018 | 32.767.619 |
| 2017 | 31.383.376 |
| 2016 | 29.831.313 |
| 2015 | 28.245.574 |
| 2014 | 26.769.837 |
| 2013 | 25.931.407 |
| 2012 | 25.979.358 |
| 2011 | 26.398.144 |
| 2010 | 26.535.097 |
| 2009 | 26.478.337 |
| 2008 | 27.574.628 |
| 2007 | 26.461.916 |
| 2006 | 24.689.753 |
| 2005 | 22.790.808 |
| 2004 | 21.120.475 |
| 2003 | 19.795.906 |
| 2002 | 18.874.734 |
| 2001 | 17.870.191 |
| 2000 | 16.545.333 |

*Table 5. Source: Own elaboration from the data from INE*

Checking another macroeconomic factor: gross domestic product, we have a situation that is very similar to the unemployment rate, as we can observe how the GDP stabilized even had a negative trend during the first years of the financial crisis and didn't recover until 2014. This obvioulsy is caused by the financial crisis, but we could also discuss that the GDP didn't recover faster or hasn't grown more because of the aging population. These factors are hard to analyze, as we don't have the right tools to do so, and on the other hand, as said, many information will lead to the financial crisis being the main reason of these effects.

Another fact to have in mind is that the effects that an aging population can have on GDP would also be if the population ages more and more, this is to say, if the situation gets worse and every time there is more old people. Therefore, as we can't know exactly what GDP will be like in the long run, we can't analyze the effect that a more severe aging population than the actual one would have.

### 4.2. What is the aging population causing to pensions

The problem with the aging population is that 30-40 years ago, the life expectancy for men was around 72 years old, and approximately 79 for women. With the age of retirement being at 65. Following to the present, this retirement age hasn't changed, but life expectancy has, and very noticeably, as nowadays it's around 86 for women and 81 for men.

This comes to say that an average pension in 1985 would cost the state 7 years for men and 14 years for women, compared to now, which would cost the state 16 years for men, and 21 for women (all this data being averages). This shows just how much the expenses for the region of Baleares have grown in terms of pensions.

As a reminder, Baleares is one of the regions in Spain that isn't aging as bad, so we can imagine that the numbers for the nation in Spain are even worse.

Therefore, the spanish government has already approved, between 2011 and 2013, that in 2027 the retirement age goes on to be at 67, being Spain one of the pioneers in changing their pension system, also because they are more in need than other countries. Another change that was approved, was changing the years of calculation of pensions, from the last 15 years of work by the pensioner, to the last 25 years, which will be implemented in 2023. These changes are necessary in order to make the aging population more sustainable, as the problems from the pyramids that have been commented need assessment.

Being one of the first countries doing a change in the pension system might seem like madness, and many of the habitants in Spain obviously disagree with it. But, as said, Spain being one of the countries in the "red zone", changes had to be done. Despite this, other countries have also thought and presented some ideas to innovate their pension system, as said by Herce (2015) (in his article *Cuadernos de Información económica,* Sweden's parliament has started talks about setting retirement age at 75 years of age. Which at first sounds like unacceptable. But after analyzing the example stated at the beginning of this section, in 1985, for example, the retirement age was 7 and 14 years away from life expectancy. If we pulled retirement age back to 75 in the Balearic region, nowadays the difference would be 6 and 11 years, which is less, but finding a midpoint between the Sweden extreme and the actual retirement age (a midpoint between 65 and 75: 70) would be more sustainable economically and wouldn't see a change in welfare from 1980s to the present, as, again, the gap between retirement age and life expectancy would now be 11 and 16.

So analyzing this section, we can realize that one of the main problems is that we have learned to gain in welfare (which everyone wants and no one will never complain about), as our life expectancy has been growing but our retirement has been stagnant for decades. This means more people living off the state for longer, which people in active age have to maintain with their taxes, and as we have seen in the population pyramids, etc. the middle sector will shrink in the near future, as the *baby boom* generation reaches retirement.

**Graph 16. Life expectancy versus retirement age for men in Europe.**
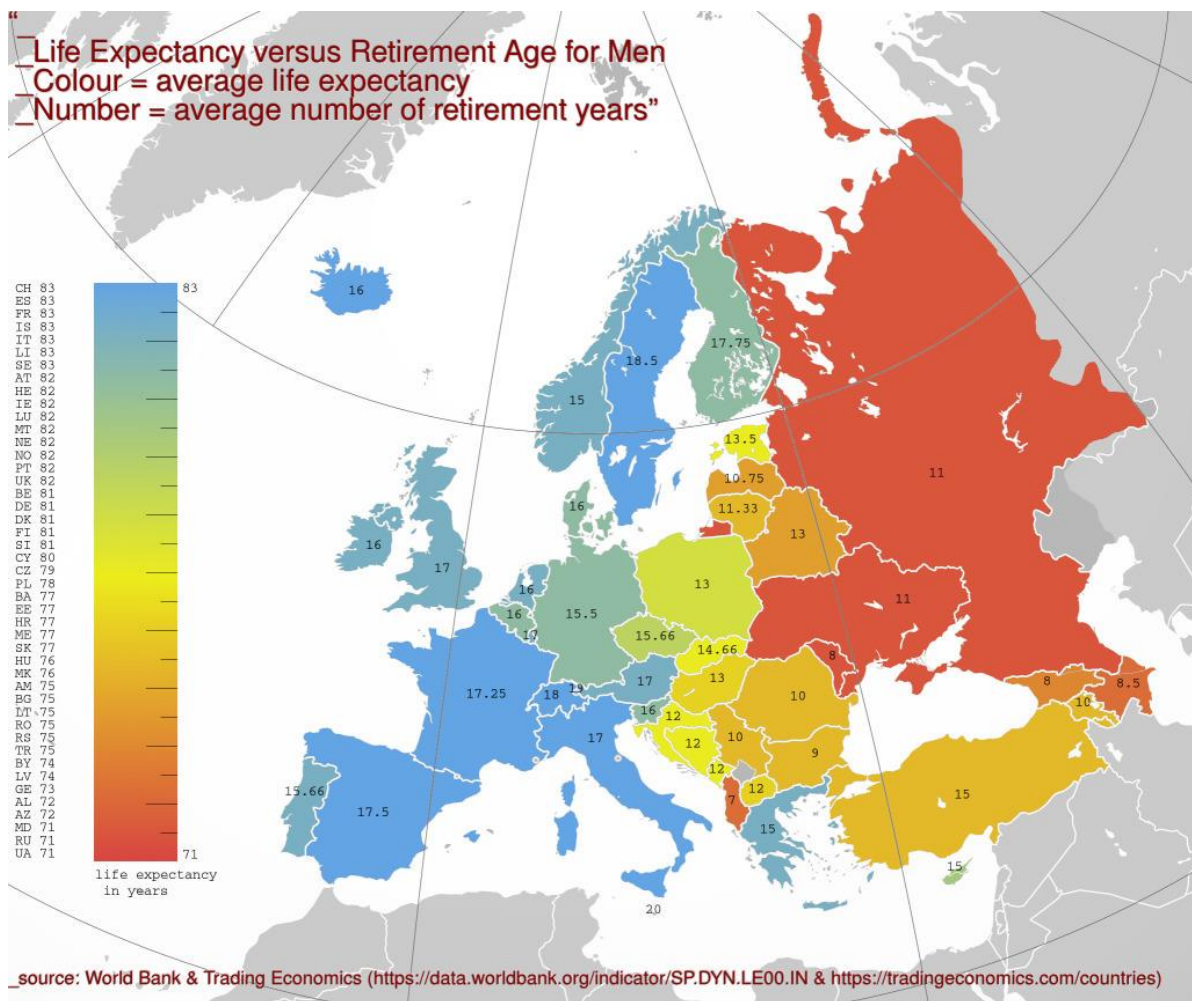


Graph 16. Source: World Bank & Trading Economics

In *Graph 16* we have a perfect example of what we were just analyzing. In blue we have countries with a higher life expectancy and in red, lower life expectancy. The numbers in the countries represent the average years men spend in retirement. As we can see, the countries that are yellow/red have less years in retirement age and the blue countries, the ones with more life expectancy, which are, in general, the more developed ones, have high numbers, which means that the state in that country has to maintain, on average, a lot of years the pensioners.The example of Spain, as we have been talking about, is one of the top 5 countries in Europe with the longest time that people live in retirement age, 17,5 years.

Another point to stand out from *Graph 16* is Sweden, which we have also talked about. As we can see, they are in blue, and they have a population which has the highest duration in retirement age in Europe, with an average of 18,5 years, therefore that is the reason they are also talking and thinking very seriously about applying a change in their pension system.

## 4.3. How does an aging population affect it's GDP?

Another macroeconomic factor which has or which we can see an effet due to an aging population is gross domestic product (GDP). We come back to the same idea; if the population of the region gets older, there will be less workers. Therefore the GDP of that region can have a negative effect. As said by Mestres Domenech (2018) in his article:

> "Likewise, if the relative weight of the population in active age decreases relative to the population as a whole, GDP per capita would also decrease."

It's clear that, in the short run, if active population decreases, it will lead to a decrease in both GDP and GDP per capita. On the other hand, there is some controversy in long run and how that can affect GDP, as many articles and studies have found that in recent years, many businesses are starting to change human workforce, for machines. Which in the future this change will become stronger and will make workforce reduce signifantly. Therefore, with less workers, firms will produce the same products, so in this regard GDP and per capita GDP wouln't be affected.

Accordingly, there is some controversy and uncertainty between the effect an aging population has on gross domestic product, especially if we are refering to short run or lung run.

# 5. Conclusion

Aging population, as seen, is a demographic process that can be devastating in not just economical terms, but also in regenational processes, in creating healthy future generations.

As we have mentioned many times, an aging population is already a reality, and, unless measures are strict and in numerous amounts, we won't see an improvement, as it's a problem that is easy to get out of control, but hard to get back the control of the situation.

The world population, in general and as a whole is getting older, and that is a fact. There is no stopping it. The only measures that can be taken are to try and change the negative effects it has, mentioned before. For this reason, only the government can take action in doing so, obviously with the help of the population, but they have to be the base of the pyramid that creates and builds a good pattern that makes this aging, which is already a reality, more sustainable.

In the project, we take the example of the Balearic Islands, which, as a region in Spain, and as so, many of the main problems that we can find in the islands, are the same ones as the ones in the country as a whole. These main problems are the low fertility or birth rate, and the increasing life expectancy, especially in Spain. Taking into account that these are the main problems that cause aging, the government could take action on one of the issues, as they can't stop the life expectancy span. Therefore, something they can work on is incentivizing society to have more kids, so the birth rate goes back up. This is a measure that has already been applied in Spain, but there is a certain degree to it, as they have some measures such as discounts for large families, cataloged to families with 3 or more kids, and more. They could apply many more measures of this kind, because the ones they have applied haven given a good enough effect, as, as we have seen, the birth rate is still too low in the Balearic region.

Analyzed the first part of the issues and how the government can have an effect and intervene in that sense, even if it's just in one of the problems; birth rate. It's time to see what they can provide and change in order to start changing the economical effect the aging population is causing. Pensions and the lack of labour force in upcoming years are two of the main issues. We have mentioned that countries are starting to discuss where to go with pensions and apply changes, as they are becoming unsustainable for many countries. Spain has already taken action and will make retiring age go up by two years, from 65 to 67. But, will this be enough? It seems as measures need to be a little bit more strict, as desperate issues require desperate and strict measures. The Sweden option, where they discussed moving it up to 75 also seems to extream, so finding an equilibrium would seem right. In the case of the lack of labour force, it seems that there is no certain way to change that, as more than anything, it originates in the same way as the general issues that create an aging population that we talked about.

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