Independent Authority for Fiscal Responsibility

Opinion

Annex 2

25 November 2014

Determination of the 2015 Revaluation Pension Index

Annex 2. How pensions will vary: pensions number and the replacement effect

AIReF has estimated the series required for the calculation of the Revaluation Pension Index (RPI). For the period 2015 - 2020:

- The number of pensions shows an average annual growth rate of 1.3%,
- The average annual replacement rate effect will stand at 1.4%, as the difference between the increase in the average pension and the RPI.

Following the methodology described in this annex, calculations are based on the Ageing Working Group (AGW) data, the 2013 Continuous Working Life Sample (CWLS) and the Social Security series.

The Independent Authority for Fiscal Responsibility (AIReF) was founded with the mission of overseeing strict compliance of the budget stability and financial sustainability principles provided for in article 135 of the Spanish Constitution.

AIReF Contact:

C/José Abascal, 2, 2º planta. 28003 Madrid.Tel. +34 91 010 08 95

Email: Info@airef.es.

Website: www.airef.es

INTRODUCTION

AIReF has independently estimated and assessed the series supplied by the Ministry of Employment and Social Security (MOESS) and used in the 2015 RPI calculation.

.

EXPENDITURE

The 2015-2020 planned expenditure estimated by AIReF, in connection with the variation in the number of pensions and the replacement rate, are consistent with the forecasts supplied by the MOESS. According to these data, the annual change in the number of pensions and their average level due to the impact of the replacement effect would imply average growth rates of 1.3% and 1.5%, respectively.

The information sources and the procedure followed by AIReF to undertake its estimates are described below.

The estimates below should be considered with caution, particularly the one related with the replacement rate. This is due to many factors affecting the results obtained. The most important of these uncertainty sources are the above-mentioned gradual increase in the statutory retirement age, the increase in the regulatory base period from 2013-2022, or the fact that the sustainability factor kicks in at the end of the analyzed period.

1. NUMBER OF PENSIONS GROWTH ESTIMATION

1.1. Information sources

A range of sources were used to generate the series:

- The Ageing Working Group (AGW) file, which supplies different types of demographic and labour market data at annual frequency for the years 2013-2060.
- The 2013 Continuous Working Life Sample (CWLS), an administrative file which supplies a sample with information on labour and social contributions of a sample of workers, as well as data on different types of contributory benefits.
- Statistics from the bulletin published by the Social Security system.

Forecasting procedure

The primary information source is the Social Security system, in its official statistics on the number of pensioners in 2014 broken down according to age and gender. This is shown as $Npen_{2014e,s}$, where "e" is the total number of pensioners of a certain age in 2014, while "s" indicates their gender.

Based on this datum, the next step is to determine the number of pensions that will be registered in the years up to 2020, as well as how the death rate varies:

- **Death rates** are calculated by considering the macroeconomic scenario proposed by the Ageing Working Group (AGW) – which offers data on the annual death rates for a certain year "t" broken down according to age and gender, and shown as $mort_{t,e,s}$. These data are multiplied by the number of pensioners in a specific year, thereby obtaining the number of pensioner deaths, i.e., the number of losses ***(Bajas)*** from the pension system.

$$Bajas_{t,e,s} = Npen_{t-1,e-1,s} \times mort_{t,e,s} \quad (1)$$

- To calculate the number of **new registered pensioners *(Nuevas Altas),*** the first step is to calculate the "rate of registration in the pension system". This quotient is obtained by using two information sources:

  The quotient numerator is obtained by using the 2013 Continuous Working Life Sample (CWLS) to determine the number of people who register in the pension system according to their age and gender:

  $NuevasAltas_{2013e,s}$.

  ✓ For the denominator, the above-mentioned AGW file offers information on the total population in 2013, broken down according to age and gender and shown as ($Pob_{2013e,s}$), where subscript "e" shows the different ages (0, 1,…, 100) and "s=h,m" refer to "men" and "women".

  The rate of registrations in the Social Security system in the year 2013 is therefore calculated by dividing the two variables:

$$Talta_{2013e,s} = \frac{NuevasAltas_{2013e,s}}{Pob_{2013e,s}}$$

With this rate, the number of new pensioners per year, age and gender is given by:

$$Altas_{t,e,s} = Pob_{t,e,s} \times Talta_{2013e,s} \quad (2)$$

Where the population per year/age/gender, $Pob_{t,e,s}$, for the period 2014-2020 is obtained from the AGW (which gives information up to 2060).

Finally, the total number of pensioners in one year is obtained by:

$$Npen_{t,e,s} = Npen_{t-1,e-1,s} + Altas_{t,s,e} - Bajas_{t,s,e} \quad (3)$$

i.e., the pensioners in a specific year are the same as those in the year before, plus the new pensioners this year and minus those who have died.

Moreover, these forecasts have taken into account the impact of the pension system reform regarding retirement age. This will gradually increase from 65 years and one month in 2013 to 67 years in 2027.

Results

Calculations undertaken using the described methodology give the result of an average annual growth rate of 1.3% in the number of pensions for the period 2015-2020.

2. REPLACEMENT RATE ESTIMATION

The average pension may increase due to two reasons: increase in nominal value and the replacement effect.

- The "nominal" value of pensions increases when they are updated. This may take place according to the CPI (the years up to 2014[1]) or the IRP (after 2015).
- The other cause of a rise in the average pension is the replacement effect. This is because new pensioners who register with the system receive higher pensions than was the case for those who die (in July 2014, the average pension at registration was 1,018.19 Euros, while the average pension for those who died during this month was 835.96 Euros). The increase in the average pension for this reason is not due to an index-linked increase, but rather to a "replacement" effect, in which the average sums received by the new pensioners who replace those who die are not the same.

[1] In 2014 pensions were raised by 0.25%.

The increase in the average pension can be expressed as:

$$\Delta pension\ \text{media} = \underbrace{(PRI)}_{\text{incremento "nominal"}} + \underbrace{(efecto.sustitucion)}_{\text{incremento "real"}} \quad (4)$$

2.1. Information sources

Similarly to forecasting pension numbers, the sources used are the AGW file and the 2013 Continuous Working Life Sample (CWLS)[2]. This file makes it possible to classify data according to pension type (retirement, widowhood, disability and orphanhood), according to gender and age (with an annual average for each year) generating annual data about the total number of new pensioners and their average pension; the number of deaths and the average pension they had been receiving; the number of existing pensions and the average pension.

2.2. Forecasting procedure

Estimates of variations in the replacement rate are based on the demographic scenario in the AGW and variations in the numbers of new, current and ex- pensioners, based on the CWLS. The CWLS has also been used to generate wage levels, as these affect the initial pension of future pensioners, while also taking into account the sequential implementation of the 2011 reform and the coming into force of the 2019 sustainability factor.

When calculating the average pension of pensioners[3] in a certain year, the latter will firstly be divided into three different types: those who have been registered for the whole year, known as “comunes”, those who were registered during the year (“altas”) and those who died (“bajas”), in such a way that the average pension in the year may be obtained as:

$$penmed_t = \frac{Comun_t \times pmc_t + 0.5Altas_t \times pma_t + 0.5Bajas_t \times pmb_t}{Comun_t + 0.5Altas_t + 0.5bajas_{ts}} \quad (5)$$

Where $penmed_t$ is the average pension in the year “t”, the variables $Altas_t, Bajas_t$ are the numbers of pensioners who register and leave in one

[2] This information will be completed when necessary with the statistics of the official bulletin of the Social Security system.
[3] Before describing how the number of pensioners is obtained, it should be remembered that in Spain there are differences between the “number of pensioners” and the “number of pensions”. In general the ratio corresponds to 1.1 pensions per pensioner. Due to this, if it is wished to show the “number of pensions” then it will be necessary to multiply the number of pensioners by 1.1, as otherwise the total expenditure here will be under-estimated.

year, as defined above, while $Comun_t$ is the number of pensioners who are registered throughout the whole year[4], giving:

$$Comun_{t,e,s} = Npen_{t-1,e-1,s} \times \left(1 - mort_{t,e,s}\right)$$

Where $Npen_{t-1,e-1,s}$ is the number of pensioners defined previously and $mort_{t,e,s}$ is the death rate in year "t" per age and gender, as shown in the AGW file.

Three other figures are shown in equation (5): pmc_t, pma_t, pmb_t . These refer to the average pensions of pensioners who were registered throughout the year *("comun")*, those who registered during the year and those who died, respectively. These are described below.

- The **registration of new pensioners** for those who retire depends on the retirement age, ρ (to receive 100% it is necessary to be 65 years old in 2013, while this age will be gradually increased up to 67 years old in 2027). It also depends on the number of years during which contributions were paid, r (35 years to receive 100% of the pension) and wages (the bases for contribution) over recent years:

$$pma = \rho \times r \times BR \qquad (6)$$

Where the parameters ρ, r are set by legislation, while the Regulatory Basis is obtained in the following way:

$$BR_{t,e,s} = \frac{BaseC_{t-1,e-1,s} + BaseC_{t-2,e-2,s} + \sum_{t=3}^{ab} \frac{\pi_{t-3}}{\pi_{t-j}} BaseC_{t-j,e-j,s}}{ab} \qquad (7)$$

Where the amount $BaseC_{t,e,s}$ is the Basis for contribution in the year "t" for different combinations of ages and gender (e,s), while π_i is the rate of inflation in year "i" and "ab" is the number of years considered when calculating the Regulatory Base.

The inflation series until the year 2014 is obtained from the National Statistical Institute, while for forecasts until 2020 the data supplied by the AGW are used, as this gives an annual series of inflation until the year 2060. As for the contribution bases, $BaseC_{t,e,s}$, the CWLS makes it

[4] The reason why new pensioners as well as deaths are multiplied by 0.5 in the previous equation is to prevent "double accounting" of the number of pensioners. As for new pensioners, this variable is expected to be registered more or less evenly throughout the year. (The situation is similar for those who die, i.e. the distribution is taken to be uniform throughout the year).

possible to obtain the annual average contribution base for the period 1980-2013 for combinations of age and gender “e”/”s”. As for the period 2014-2020, forecasts for this variable will be made by applying the following formula:

$$BaseC_{t,e,s} = BaseC_{t-1,e,s} \times (1 + \Delta \mathrm{Pr} odEmp_t)$$

(8)

In this, the average contribution base in the year “t” is the one corresponding to the year before, $BaseC_{t-1,e,s}$, multiplied by the productivity growth rate of the labour factor, $(1 + \Delta \mathrm{Pr} odEmp_t)$ proposed in the macroeconomic scenario of the AGW.

- For the **pensions which corresponded to those who exit**, the data of the CWLS are used to obtain the time series of pensions which commence, continue or cease during the period 2000-2013. These data are used to study the relationship between the pensions which cease during a certain year and those which commenced and continued in the year before, calculating the following econometric model[5]:

$$pmb_{t+1,e+1,s} = \beta_0 + \beta_1 pmc_{t,e,s} + \beta_2 pmc_{t,e,s} + \beta_3 pma_{t,e,s} + \varepsilon_{t+1.e+1,s}$$

(9)

Where the variables $pmb_{t,e,s}, pmc_{t,e,s}, pma_{t,e,s}$ are series of data observed for the period shown, the term $\varepsilon_{t+1.e+1,s}$ is the error of the model, which is assumed to be normally distributed with an average of zero and a variation of σ_ε^2, while the parameters to be calculated using the model are those given by $\beta_0, \beta_1, \beta_2$ and σ_ε^2. Once (9) has been calculated and the estimations for parameters $\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2$ are obtained, it is possible to make forecasts of the pensions that cease for the period 2014 – 2020 by using the expression:

$$pmb_{t+1,e+1,s} = \hat{\beta}_0 + \hat{\beta}_1 pmc_{t,e,s} + \hat{\beta}_2 pmc_{t,e,s} + \hat{\beta}_3 pma_{t,e,s}$$

[5] To prevent problems with co-integration, this equation has been calculated on the basis of rates of variation rather than level.

- Finally, from equation (5) the **average benefit for the pensioners who continue throughout the whole year** (those known as *"comun",* who were registered for the whole year, pmc_t) is obtained. Before 2013 this takes place using the CWLS, which contains historical data. Forecasts up to the year 2020 are calculated in a simplified way, as:

$$pmc_{t+1,e+1,s} = \frac{Comun_{t,e,s}\, pmc_{t,e,s}\left(1+PRI_{t+1}\right)+0.5Altas_{t,e,s}\, pma_{t,e,s}}{Comun_{t,e,s}+0.5Altas_{t,e,s}}$$

(10)

Where pension updating is given by $\left(1+PRI_{t+1}\right)$, which is the Revaluation Pension Index (IRP) that comes into force in 2015, while in annex II two methodologies are proposed for calculating this index. Once all of the amounts in equation (5) have been determined, it is possible to generate a series over time of the average pension in a single year, $penmed_t$, so that the annual rate of increase is calculated in the following way:

$$\Delta penmed_t = \frac{penmed_t - penmed_{t-1}}{penmed_{t-1}}$$

The replacement rate is obtained by taking equation (4) into account, where the rate of pension increase is a combination of the Revaluation index and the replacement factor, so that:

$$\Delta penmed_t = IRP_t + efectosust_t$$

In such a way that:

$$efectosust_t = \Delta penmed_t - PRI_t$$

2.3. Results

The calculations undertaken according to the described methodology yield an average replacement rate of 1.4% for the period 2015-2020.