TECHNICAL DOCUMENT ON METHODOLOGY TO ESTIMATE PENSION EXPENDITURE. RESULTS

TECHNICAL DOCUMENT 3/25

April 24th, 2025

AIReF
Independent Authority for Fiscal Responsibility

The Independent Authority for Fiscal Responsibility (AIReF) was created with the mission of ensuring strict compliance with the principles of budgetary stability and financial sustainability enshrined in Article 135 of the Spanish Constitution.

Contact AIReF:

C/José Abascal, 2, 2º planta. 28003 Madrid, Tel. +34 910 100 599

Email: Info@airef.es.

Web: www.airef.es

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1. INTRODUCTION

The ageing process affecting the Spanish population makes it necessary to estimate its impact on General Government (GG) revenue and expenditure. Within revenue and expenditure, expenditure on pensions takes on greater importance, both because of the weight of this expenditure in total expenditure and because of its direct relationship with ageing.

Between 2021 and 2023, through Law 21/2021 on Guaranteeing the Purchasing Power of Pensions and Other Measures to Strengthen the Financial and Social Sustainability of the Public Pension System and Royal Decree-Law 2/2023 on Urgent Measures to Extend Pensioners' Rights, the Government of Spain adopted a series of measures aimed, in principle, at improving sustainability.

In this context, AIReF has developed an exhaustive methodology for estimating the ratio of pension expenditure to GDP, which is used to obtain the results of the Opinion on the Sustainability of the General Government Sector[1] which accompanies this Technical Document. In this document, both the methodology and the detailed results obtained for the baseline scenario of the Opinion are presented in detail.

[1] Opinion-on-the-Long-Term-Sustainability-of-the-GG/

2. MODEL METHODOLOGY TO ESTIMATE PENSION EXPENDITURE

2.1. Historical and medium-term expenditure (2011-2029)

AIReF takes as a **starting point the administrative records of the Social Security system and civil servants scheme over the total number of pensions in the system by type of pension, gender and age, available up to 2023**. These data provide information on the average pension and the number of pensions for the breakdown specified. This information is complemented by IMSERSO data on non-contributory pensions. These data are available up to 2023 in this publication. These records are calibrated with the total expenditure on pensions in the Spanish National Accounts published by the General Intervention Board of the State Administration (IGAE) for 2023. **For the medium term, 2024-2029, AIReF uses the information published by the Social Security[2] and maintains its estimates, published in the November 2024 report[3].**

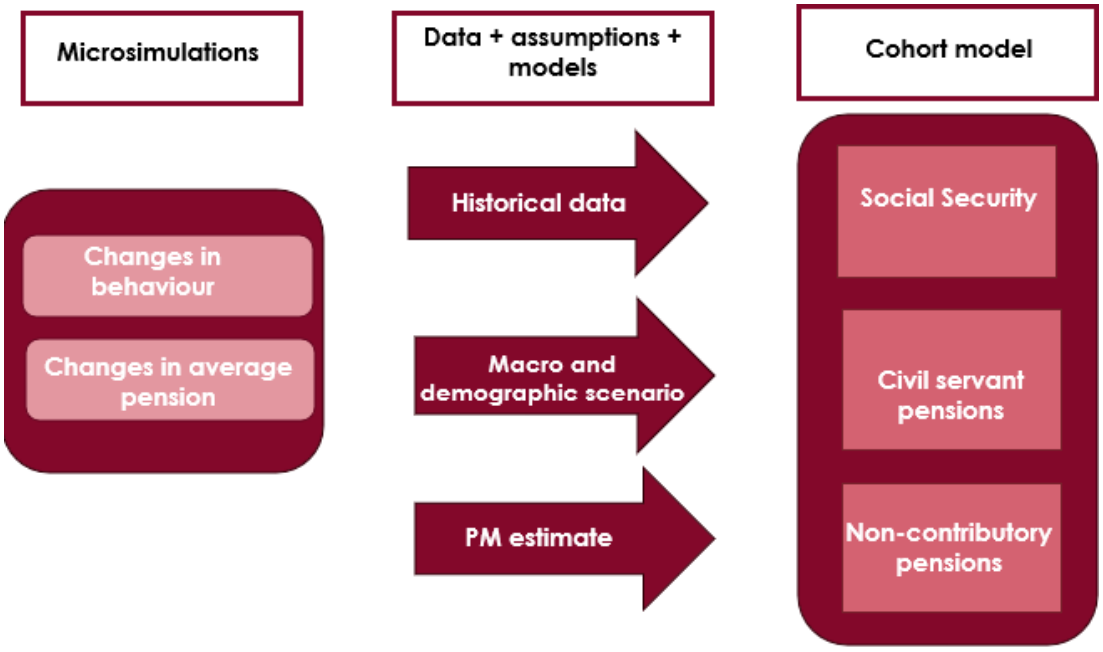
[2] eSTADISS database available until February 2025 and information on Social Security budgetary execution available until November 2024.

[3] Report-on-the-Main-Lines-and-Draft-Budgets-of-the-GG-for-2025

2.2. Long-term expenditure. Pension model

AIReF has developed **a cohort model made up of three modules, one for Social Security pension expenditure, another for expenditure under the civil servants scheme and a third for non-contributory pensions**, which are consolidated to obtain the evolution of pension expenditure by the GG. These three modules are **based on the results of the programmes used to analyse the Continuous Professional Life Sample (CPLS)** to gauge the impact of regulatory changes on participation rates and the average pension and those in which the adequacy, equity and contribution of the system are analysed.

TABLE 1. SOURCES OF THE AIREF PENSION EXPENDITURE ESTIMATE



Source: AIReF

The three modules are based on AIReF's demographic and macroeconomic scenarios. The estimate is based on the breakdown of expenditure on average pensions and the number of pensions, further broken down by gender, age and type of pension for each year.

$$G_t = \sum_{s,e,p} Pm_t^{s,e,p} * N_t^{s,e,p} \qquad [1]$$

The number of pensions, for each of the subgroups described, is estimated as the pensions of that subgroup in the previous year, when they were one year younger, plus the estimated new registrations for that age and year minus the estimated deregistrations for that age and year.

Registrations are determined exogenously, estimating the probability of each subgroup to access that pension and multiplying that probability by the population corresponding to each type of pension. Registrations have a very erratic structure, whereby the probability of accessing the pension is estimated by taking into account the registrations of the last five years among the average population of those five years[4].

Deregistrations (B) of an age are estimated by applying the mortality rates estimated by AIReF to the number of pensions in that subgroup in the previous year, when they were one year younger, and considering that the mortality of new registrations occurs constantly throughout the year.

$$B_t^e = N_{t-1}^{e-1} * Mort_t^e + A_t^e * Mort_t^e * 0{,}5 \qquad [2]$$

The number of pensions in a given year will be the previous year's pension stocks plus that year's new registrations minus deregistrations.

$$N_t^e = N_{t-1}^{e-1} + A_t^e - B_t^e \qquad [3]$$

When projecting the evolution of the average pension, a different assumption is made for the evolution of the average pension of the new registrations from the average pension of the current stock. While the average pension for registrations is assumed to evolve with the CPI and productivity (in line with wages), the average pension for the current stock (and deregistrations) is revalued with the CPI. In both cases, this is the CPI of the previous year, as established by legislation

$$PmA_t^e = PmA_{t-1}^{e-1} * (1 + \Delta prod_t + \Delta IPC_{t-1}) \qquad [4]$$

The average pension of deregistrations is estimated with a weighted average of the stock updated with the CPI and the deregistrations of that year.

$$PmB_t^e = \frac{N_{t-1}^{e-1} * Pm_{t-1}^{e-1} * (1+\Delta IPC_{t-1}) + A_t^e * PmA_t^e}{N_{t-1}^{e-1} + A_t^e} \qquad [5]$$

The average pension for an age and a year is the weighted average of the previous year's stock plus registrations minus deregistrations.

$$PmB_t^e = \frac{N_{t-1}^{e-1} * Pm_{t-1}^{e-1} * (1+\Delta IPC_{t-1}) + A_t^e * PmA_t^e - B_t^e * PmB_t^e}{N_{t-1}^{e-1} + A_t^e - B_t^e} \qquad [6]$$

The three modules follow this equation for all types of pensions, but with some particularities specified below.

[4] The years 2020 and 2021 are not included in the estimate.

2.2.1. Retirement pensions

The retirement pension is the benefit that is acquired over the course of a worker's working life and is received after the worker leaves the labour market.

In this case, when estimating the average pension of new registrations, given that Spanish legislation establishes that the contribution bases of the last two years are not updated when calculating the regulatory base, they are revalued with the CPI of three previous years instead of the CPI of the previous year.

$$PmJubA_t^e = PmJubA_{t-1}^{e-1} * (1 + \Delta prod_t + \Delta IPC_{t-3}) \quad [7]$$

Furthermore, by their very origin, registrations for retirement are closely linked to the exit from the labour market and activity rates. Thus, an increase in the participation rate at a given age will reduce new registrations at that age. In addition, registrations for retirement have a very varied profile. AIReF thus makes the assumption that exits from the labour market for ages over 61 will coincide with registrations for retirement in 2035. From the starting year to the convergence year, registrations for retirement evolve in a linear fashion until they coincide with the exits from the labour market.

Based on participation rates, the individual's labour market permanence rates are estimated as the participation rate for an age and year divided by the participation rate for that age group one year earlier, when they were one year younger[5], with the exit rate being the complementary probability to the permanence rate.

$$TPerm_t^e = \frac{TPart_t^e}{TPart_{t-1}^{e-1}} \quad [8]$$

$$TSal_t^e = (1 - TPerm_t^e) \quad [9]$$

Once you have the probabilities of exiting the labour market, the number of exits will be that probability times the previous year's labour force of that age group, when it was one year younger. In this case, the civil servants module takes active civil servants as a reference. To estimate the exits of Social Security affiliates, the labour force will be the total minus active civil servants.

$$SalidasCPE_t^e = TSal_t^e * ActivosCPE_{t-1}^{e-1} \quad [10]$$

$$SalidasSS_t^e = TSal_t^e * (PobAct_{t-1}^{e-1} - ActivosCPE_{t-1}^{e-1}) \quad [11]$$

[5] The permanence rate is considered to be 0% at the age of 74, i.e. the total population exits the labour market that had not exited before.

The probability of not retiring is also estimated from the permanence rates. Up to the age of 60, the probability of not retiring is considered to be 100%. Thereafter, it will be the probability of not retiring from the previous age times the permanence rate for that age.

$$PnoJub_t^e = PnoJub_t^{e-1} * TPerm_t^e \quad [12]$$

And on a complementary basis, the probability of retiring is calculated as the probability of not retiring times the exit rate.

$$PJub_t^e = PnoJub_t^e * TSal_t^e \quad [13]$$

Once the probabilities of retirement are known, the effective retirement age is estimated as a weighted sum of the retirement ages by the probability of retiring at each age.

$$EEJ_t = \sum_{e=60}^{74} e * PJub_t^e \quad [14]$$

This links the macroeconomic scenario to individuals' retirement decisions. If the decisions change, the participation rates change, and GDP changes as a result.

2.2.2. Disability pensions

The disability pension is a benefit that covers the loss of income suffered by a person who is affected by a pathological or traumatic process resulting from an illness or accident and whose working capacity is presumably permanently reduced or eliminated.

The number of disability registrations is calculated by applying the probability of becoming disabled from an average of recent years[6], constant for the projection horizon.

$$ProbInc^e = \frac{\sum_{t=t-5}^{t} AltInc_t^e}{\sum_{t=t-5}^{t} Pob_t^e} \quad [15]$$

Disability registrations are estimated by applying this probability to the number of employed persons in the previous year. From the age of 64, it is considered that there are no registrations due to disability as they are already considered to be retirement registrations.

Disability deregistrations are configured differently, as a distinction must be made between deregistrations due to mortality and deregistrations due to other causes. Deregistrations due to mortality are estimated by multiplying the

[6] The years 2020 and 2021 are excluded.

mortality rate by the number of disability pensions of the previous year and the registrations of this year by 0.5 (considering that registrations occur uniformly throughout the year).

$$BMort_t^e = (NInc_{t-1}^{e-1} + AInc_t^e * 0{,}5) * Mort_t^e \quad [16]$$

For the remaining deregistrations, the ratio of "other disability deregistrations" is estimated based on the number of deregistrations in the baseline year that were not due to mortality and this ratio is considered to be sustained for the remainder of the period.

$$OB_t^e = \frac{BInc_{base}^e - BMort_{base}^e}{BMort_{base}^e} * BMort_t^e \quad [17]$$

In the case of the average deregistration pension, an adjustment mechanism is introduced, as the pensions for disability deregistrations are associated with the most severe disabilities and are therefore subject to a higher amount than the stock of pensions. The average deregistration pension is therefore weighted as a pension 15% higher than the stock of pensions.

$$PmB_t^e = 1{,}15 * Pm_{t-1}^{e-1} \quad [18]$$

2.2.3. Widow's or widower's pension

The widow's or widower's pension is the benefit granted to persons who were married to or in a common-law relationship with the deceased.

Registrations depend on the death (deregistration) of the subjects, who may be active (BAct), permanently disabled (BInc) or retired (BJub).

For the purposes of calculating the registration of this type of pension, marriages are considered to be opposite-gender marriages in which the man is two years older than the woman. Therefore, the probability of a widow's pension registration for a woman is estimated as the number of widow's pension registrations for her age compared with the number of deaths of men two years older than her[7]. This ratio is considered to remain constant over the projection horizon.

$$AviuM_t^e = \frac{AViuM_{base}^e}{DefunH_{base}^{e+2}} * DefunH_t^{e+2} \quad [19]$$

[7] Estimated five-year average, excluding 2020 and 2021.

2.2.4. Orphan's pension

The orphan's pension is a financial benefit granted to the descendants of deceased persons as long as the stipulated requirements are met.

In this case, parallel to the case of the widow's and widower's pensions, the causal event is the death of an ascendant. The age difference between parents and children is estimated at 35 years, such that the probability of receiving this pension will be the number of pensions over the number of deaths of persons 35 years older.

$$AOrf_t^e = \frac{AOrf_{base}^e}{DefunHM_{base}^{e+35}} * DefunHM_t^{e+35} \quad [20]$$

To estimate deregistrations for orphans, in this case the cause of deregistration is not usually related to a causal event such as a death, so they are estimated by means of a deregistration coefficient.

$$BOrf_t^e = \frac{BOrf_{base}^e}{NOrf_{base-1}^{e-1} + AOrf_{base}^e} * (NOrf_{t-1}^{e-1} + AOrf_t^e) \quad [21]$$

Finally, the pension stock is estimated differently for pensions for the over-25s. For this group, it is decided to maintain the weight that these pensions have over the population of that age in the historical data.

2.2.5. Pensions for family members

The benefit in favour of family members is a financial benefit granted to those family members who lived with and were financially dependent on the deceased person and who meet the requirements.

New registrations in favour of family members depend on the deaths of the deceased persons giving rise to entitlement. It is also estimated by means of a registration coefficient, taking the total number of deaths as the basis.

$$AFF_t^e = \frac{AFF_{base}^e}{DefunHM_{base}} * DefunHM_t \quad [22]$$

3. MODEL CALIBRATION

The model as described above **has a number of limitations**, one of the main ones being that it does not include changes caused by factors other than historical evolution and the impact of demographic change. **The model needs to be calibrated to be able to include changes in the behaviour of individuals and in prevailing legislation**. AIReF carries out these estimations using the CPLS microdata and relying on the most recent aggregate data in order to observe and analyse existing trends.

3.1. Analysis of the CPLS

The CPLS is an extract of anonymised individual data from the Social Security databases, to which are added other data taken from the Continuous Municipal Register (INE) and the annual summary of withholdings and payments on account of PIT (Form 190) of the AEAT. The CPLS is compiled annually by the Directorate-General for Social Security Organisation (DGOSS). The latest version of this corresponds to the year 2023.

This microdata set describes 4% of the persons in the reference population. It reproduces the employment history of the selected persons since 1980. To be included, it is necessary to have been registered at some point in the year, which in some cases may introduce a bias. Two CPLSs are published each year, one without a tax data table (around July) and one with tax data (a few months later). Both are used in our analysis.

3.1.1. Data exploitation

The CPLS consists of a number of tables. Those used are listed below.

- **Contribution bases:** These reflect the monthly amount of the contribution bases of the persons selected for the CPLS. The contribution bases for the entire working life of the individuals are extracted from this table.
- **Pensions / benefits**: The pensions table contains detailed information on the benefits received or received in the past by the sampled individuals. This file identifies individuals who have started to receive a pension in the baseline year (registration for retirement). It also contains most of the data necessary, apart from the contribution bases, to estimate the initial pension that corresponds to them: months contributed, type of retirement, supplements received...
- **Persons**: Includes one row or record for each natural person selected for the sample. Data on gender, date of birth, nationality, etc., are extracted from this file.
- **Affiliates:** This table has all the information about the working life of each individual. A row is generated for each registration of each individual in the sample. The working life of each individual is extracted from this table.
- **Tax data**: This table contains information on the remuneration declared in the 190 Tax form.

The aim is to obtain a file with the personal and employment characteristics and the period of contributions made by the people retiring in the baseline year. AIReF has extended the analysis to include new descriptive and income variables, so that this operation is used both for analyses of the impact of changes in legislation and to estimate the profitability or generosity of the system between groups and over time. Files are generated in which the contribution gaps are filled in[8] (to estimate the pension that corresponds to each individual) according to prevailing legislation and a file in which the gaps have not been filled in (to measure the return of the system).

[8] Contribution gaps are defined as periods during which an individual has not paid Social Security contributions. Prevailing legislation determines that these gaps are completed for the calculation of the initial pension. The first 48 months are integrated with the minimum base and the rest of the months with 50% of it. In the case of women, the latest reform establishes that as long as there is a gender gap, the gaps will be integrated with 100% of the minimum base.

3.1.2. Analyses made

The exploitation of the CPLS has been carried out in **two separate ways**. One aimed at **analysing the impact of the reform in terms of behaviour and the average pension of registrations for retirement and a second**, analysed in detail in the *Technical Document on the analysis of adequacy, equity and contribution of the pension system. Special attention has been paid to the impact of the 2021-2023 reform on the pension system*, which **focuses on the impact in terms of adequacy, equity and contribution**.

The first block, which is the focus of this document, studies the impact of the pension reform on pension registrations both in terms of changes in the behaviour observed in 2021 registrations compared with 2023 registrations, allowing for projections of the trends observed (which are introduced into the expenditure projection as a change in participation rates) and in terms of the impact on the average pension they will receive (which is introduced as an adjustment to the average pension of retirement registrations).

3.1.2.1 Changes in agents' decisions

The analysis of changes in retirement decision-making allows us to form hypotheses about future behaviour. In this exercise, various changes in the retirement decision have been microsimulated to observe the change they produce on the effective retirement age.

Between 2021 and the latest data, **the effective retirement age has increased by 0.5 years, from 64.7 to 65.2.** Analysing the CPLS, the source of this change can be broken down. Changes in early retirement behaviour increase the effective retirement age by slightly more than 0.1 years. The increase in the statutory retirement age, together with the abolition of the pre-2011 scheme, have contributed 0.2 years more. Finally, the increase in delayed retirements raises it by a further 0.1 years.

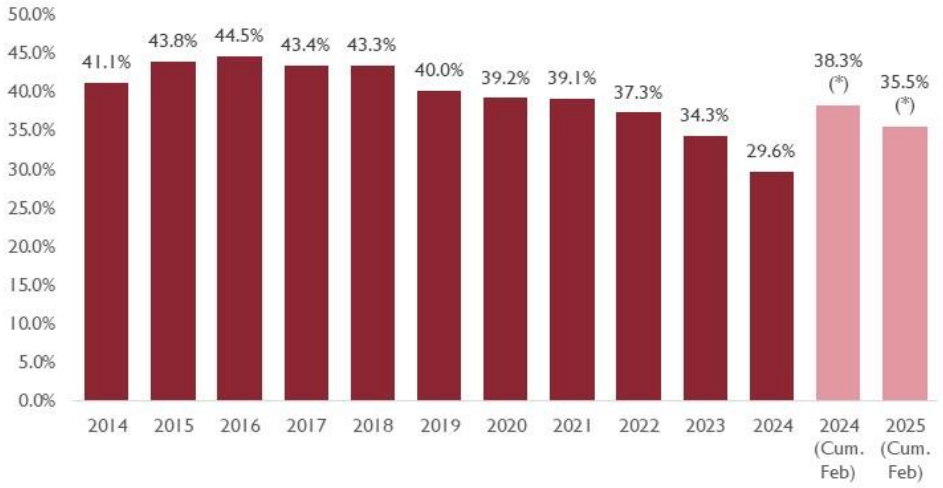
At present, the increase in the statutory retirement age together with the change in early retirement behaviour and the increase in people opting to delay retirement, **is expected to** imply that the increase in the effective retirement age up to 2050 will be 1 year, to **66.2 years,** 0.2 years of which is due to the full roll-out of the 2011 legislation.

The main changes detected in the behaviour of agents, their impact on the effective retirement age and the changes that this implies for the distribution of registrations for retirement are described below.

Reduction in the number of months of early retirement and reduction of early retirements among individuals receiving the maximum pension

Comparing the 2023 CPLS with that of 2021, there **are some behavioural changes among individuals who choose to take early retirement**. The first change to highlight is the reduction in the number of individuals choosing to take early retirement, which has fallen from around 40% since 2014 to less than 30% in 2024. Comparing the data available for the year to February 2025 with the data for 2024, this trend appears to be continuing.

FIGURE 1. EARLY RETIREMENTS. AGGREGATE DATA (% TOTAL REGISTRATIONS)

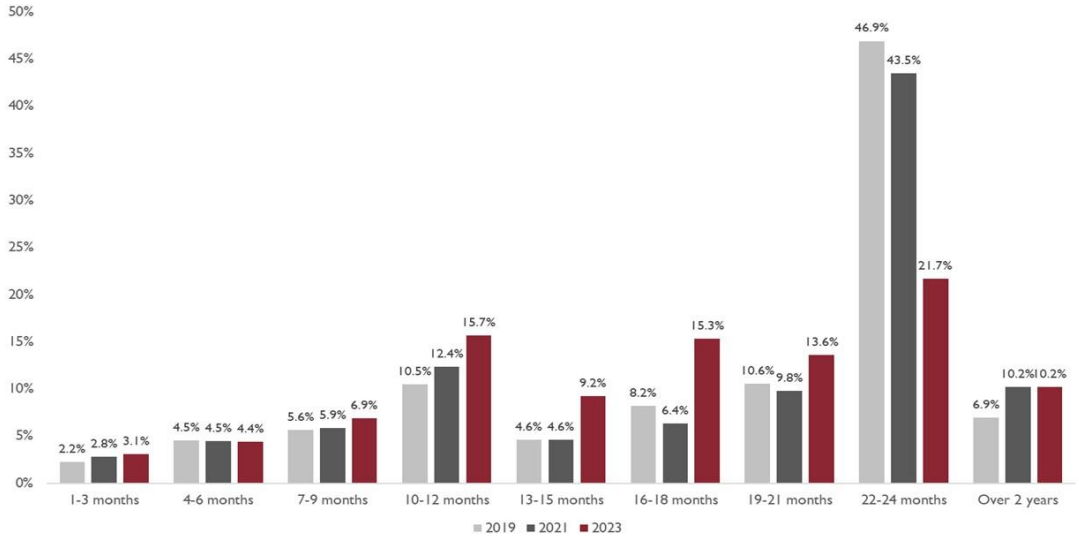


Source: Social Security

(*) Data not comparable with the rest of the series

Among those who take early retirement with uncapped pensions, the number of people taking early retirement by 24 months is decreasing and the number who bring it forward by between 1 year and 18 months is increasing. This change in attitude is reflected in a reduction in the number of people leaving the labour market at the age of 63 and a certain increase in the number leaving at the age of 64.

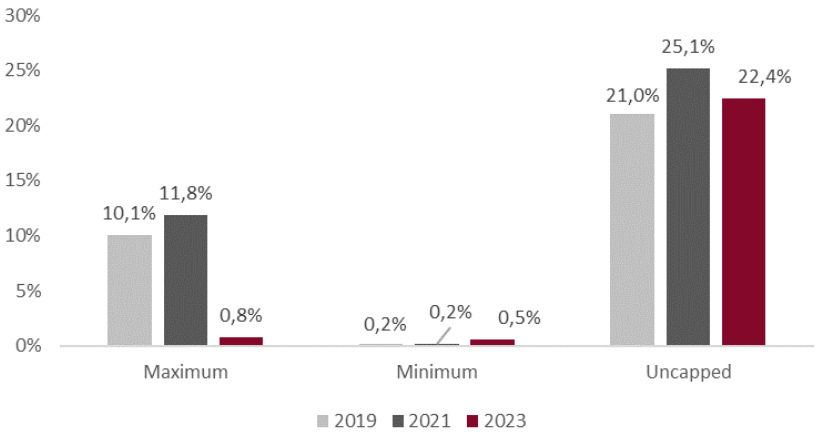
FIGURE 2. DISTRIBUTION OF MONTHS OF EARLY RETIREMENT (% OF TOTAL VOLUNTARY EARLY RETIREMENTS)



Source: CPLS 2023

It can also be seen that the individuals receiving the maximum pension who had taken the decision to take early retirement in 2021 are practically non-existent under the 2023 legislation.

FIGURE 3. PERCENTAGE OF PENSIONS VOLUNTARILY BROUGHT FORWARD BY PENSION TYPE



Source: CPLS 2019, 2021 and 2023

This change in behaviour is simulated by considering that individuals who took early retirement and received the maximum pension in 2021 choose to delay their retirement until the statutory age.

Subsequently, this is turned into the expenditure projection considering a reduction in the percentage of people leaving the labour market at 63 years of age and increasing the number of individuals leaving between 65 and 67 years of age. This impact will be somewhat greater due to the observed decrease in the percentage of people taking early retirement.

These two behavioural changes have had an impact on the statutory retirement age between 2021 and 2023 of almost 0.2 years.

Disappearance of pension schemes prior to the 2011 reform

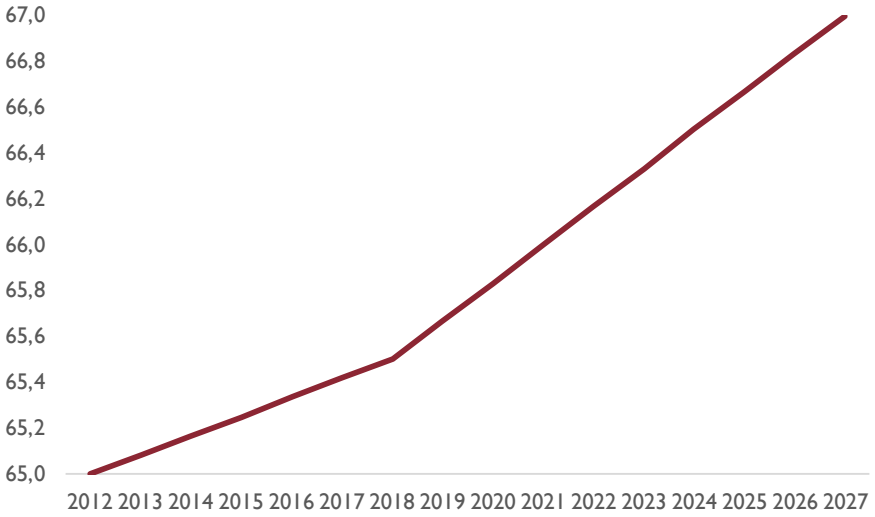
The 2011 reform allowed individuals to retire under the previous, generally more generous, rules in a transition period, subject to certain conditions. **The percentage of individuals covered by these previous schemes is in the process of disappearing**, causing the effective retirement age to rise by 0.1 years.

This turns into a very sharp reduction in exits from the labour market before the age of 63.

Impact of the increase in the statutory retirement age of the legislation passed in 2011

The 2011 reform increases the statutory retirement age until 2027. Between 2021 and 2023, this has implied an increase of 0.1 years of the effective retirement age and is expected to contribute an additional 0.1 years until 2027. The legislation indicates that the statutory retirement age for ordinary pensions will increase by one month each year between 2012 and 2018 and then by two months until 2027. The same increase is regulated for the statutory age for early retirement, which will rise from 61 in 2012 to 63 in 2027.

FIGURE 4. ORDINARY STATUTORY RETIREMENT AGE



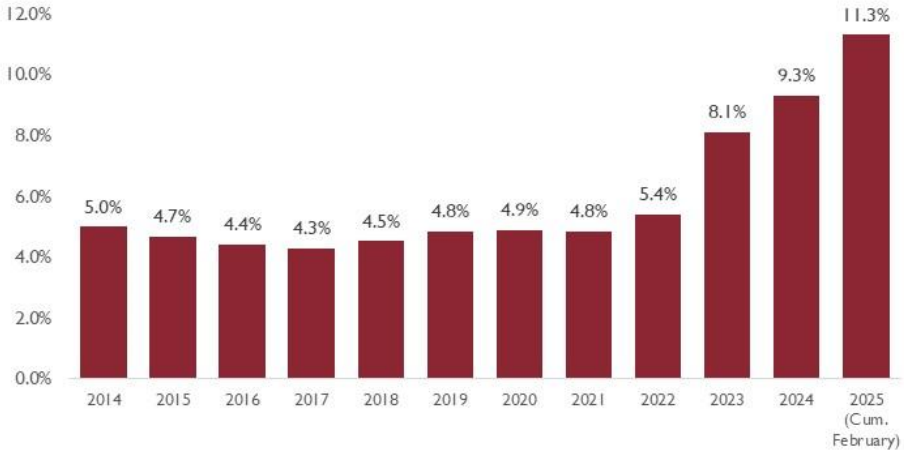
Source: Social Security

This is represented by replacing the number of exits from the labour market at age 66 by exits at age 67.

Increasing percentage of people opting for delayed retirement

The **percentage of people who have chosen to delay retirement has increased since 2021 from around 5% to 11.3% in the cumulative data up to February 2025**.

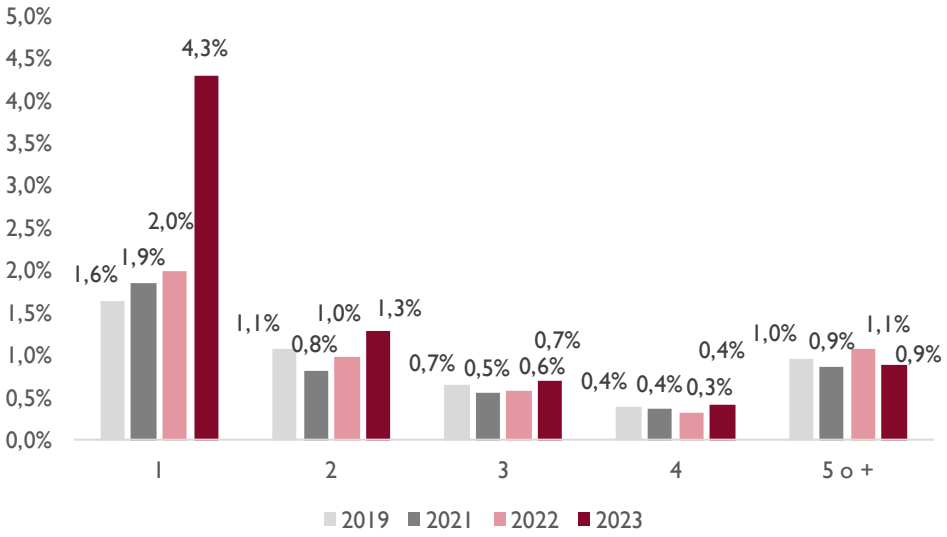
FIGURE 5. DELAYED RETIREMENTS. AGGREGATE DATA (% TOTAL REGISTRATIONS)



Source: Social Security

With the 2023 microdata, it can be seen that the increase in the number of delayed retirements is concentrated in people choosing to delay by one year, and very slightly, by two years. These would be the only retirement delay choices that could be assigned to the 2021-2023 reform, as the change in the reward structure was approved at the end of 2021.

FIGURE 6. DELAYED RETIREMENTS, BY YEARS OF DELAY (% TOTAL REGISTRATIONS)



Source: CPLS 2023

AIReF considers that the reform may continue to roll out its effects **until it reaches the point where 30% of the population delay their retirement by three years or until they reach the age of 68**[9]. Between 2021 and 2023, the increase in delayed retirements is estimated to have raised the effective retirement age by 0.1 years.

This change will turn into an increase in the percentage of people exiting the labour market at the age of 68 to 30%.

3.1.2.2 Impact on the average pension

The 2021-2023 reform modifies the way of estimating the initial pension and the revaluation of the pension stock. **This will imply a change in the average pension with respect to the historical series** that will have to be estimated and introduced into the cohort model as an adjustment to the initial pension. These impacts are estimated through micro-simulations, with the exception of the revaluation with the CPI and the repeal of the Sustainability Factor (SF). The scenario with which all the reforms are compared is a scenario in which there is neither the Pension Revaluation Index (IRP) nor the Sustainability Factor, but with the old structure of rewards and penalties, an evolution of the maximum

[9] Therefore, and taking into account other aspects of the reform, from 2027 onwards only those aged 65 with 38.5 or more years of contributions would delay their retirement by three full years. The probability of exit at higher ages is not altered by this assumption.

bases and the maximum pension at the rate of wages and considering the last 25 years of contributions for the calculation of the regulatory base.

The simulations performed to estimate the impact on expenditure of each of the measures approved are listed below and are developed in more detail in Section 4 of this document.

CPI revaluation (repeal of the Pension Revaluation Index) and elimination of the Sustainability Factor.

The impact of these reforms is measured directly with the cohort model, due to their nature.

In the case of the IRP, the programme is told that the pension revaluation is carried out with the Pension Revaluation Index and not with the CPI. Additionally, an iteration is included between the estimation of the IRP and the estimation of the expenditure, since the IRP depends on the expenditure on pensions, while the expenditure on pensions depends on the IRP. The iteration ends when a given convergence value is reached. The index with which the pensions are revalued will be the index at the time of convergence.

The Sustainability Factor is estimated on the basis of AIReF's demographic projections. The programme indicates that the pension for registrations must be corrected with the value of the Sustainability Factor for each year.

New penalties and the application of the penalty on the final pension and not on the regulatory base

To analyse the impact of this change, the resulting pension for each individual is estimated using the old penalties applied to the regulatory base and compared with the pension resulting from applying the new penalty structure to the resulting pension.

In this case, the change in behaviour between 2021 and 2023[10] has caused this measure to go from slightly reducing the initial pension to having a slight upward effect, i.e. it seems that individuals have adapted to the change in legislation by delaying their retirement in order to enjoy a higher pension.

New reward structure

This simulation is performed by taking into account **different combinations of two factors. The first is to choose the reward as an increase in the average**

[10] The number of people who bring their retirement forward by 24 months, where the new penalties were more prejudicial, has fallen and the maximum pensions that take early retirement have almost disappeared, which would be the group affected by the application of the penalties on the resulting pension instead of on the regulatory base.

pension or as a lump-sum payment. The second is to analyse the impact according to the percentage of people who delay retirement.

First of all, the impact of people who delay retirement choosing the reward as an increase in the registration (initial) pension is analysed. The average pension resulting from the old versus the new payment structure is compared. The impact is a slight increase in the initial pension.

To analyse the impact of the lump-sum payment, the average pension resulting from the old payment structure is compared with not receiving a reward on the initial pension. This implies a reduction in the initial pension. In addition, the weight of the lump-sum payments that would be paid out as a percentage of total pension expenditure in that year is estimated. This percentage is included in the cohort model as an increase in pension expenditure for that year.

For various combinations of these factors, the percentage of people choosing one option or the other is specified in the microsimulation, and some are randomly assigned the percentage reward and others the lump sum. In a second step, the change in the resulting pension and the cost of the lump-sum payment on total expenditure are estimated and introduced into the cohort model as a change in the average pension and an adjustment in the final expenditure. Analyses are performed by simulating that the percentage of people choosing the lump sum remains at 18% (2023 data), that it increases to 35% or that it increases to 50%.

In addition, these simulations must consider various assumptions about the percentage of people who choose to delay retirement. In 2023, around 8% of the population chooses to delay retirement. The latest available data for January 2025 indicate that just over 11% will have chosen to delay retirement. AIReF thus estimates the change in the average pension given a rise to 20%, to 30% or to 50%. All the increases in delayed retirement, except in the options where everyone opted for the lump sum, translate into a higher pension due to more people receiving a reward.

Evolution of maximum pension and maximum contribution bases

The reform establishes a different evolution of the maximum pension and the maximum contribution bases. Until 2050, the latter will grow at a faster rate, while from then on, maximum pensions will grow at a faster rate. This legislation leads to an increase in the number of maximum pensions that are capped, resulting in a decrease in the average registration pension until 2050 compared with the average pension that would prevail in the absence of this measure. Thereafter, the effect is partially reversed, with the maximum pension increasing at a faster rate, thereby increasing the average pension.

To simulate this measure, we consider an evolution of the contribution bases at the rate established for wages and an evolution of the maximum contribution base and the maximum pension at the rate indicated in the legislation until 2070. The programme simulates this evolution and determines the pensions that are capped according to this evolution. This simulation is compared with a situation in which contribution bases, the maximum contribution base and maximum pension evolve at the same rate as wages, resulting in a reduction in the average pension until 2050 and a certain upward reversion thereafter.

Number of years to be taken into account for the regulatory base

The reform modifies the number of years to be taken into account to calculate the regulatory base, from the last 25 years in force to the last 29 in which the best 27 are selected. Until 2045, the option that results in a higher pension will be assigned.

To perform this simulation, a situation is considered in which the last 25 years of contributions are selected to estimate the regulatory base. The alternative situation is that the last 29 years of contributions are ordered from lowest to highest and the 27 highest years are selected. To simulate the transition period, the result of the two calculation methods is considered for each individual and the optimal one is selected in each case. This results in a small increase in the pension until 2045. After the end of the transition period, the impact is a decrease in the average pension.

In addition, the simulation is performed of the pension evolution if the regulatory base is estimated over the whole working life. In this case, the impact on the average pension is substantially greater.

Increase in the minimum pension (and non-contributory pensions) to reach the poverty threshold (or 75% of the poverty threshold).

The reform establishes that both minimum and non-contributory pensions will be increased until 2027 at a higher rate than other pensions in order to reach the poverty threshold[11].

The impact of this measure is calculated in two ways. First, by estimating the necessary pension increase and weighting it by the total number of pensions, distinguishing the growth forecast by type of minimum pension and non-contributory pension.

[11] In the case of minimum pensions with a dependent spouse, the poverty threshold for a two-person household must be reached. In the case of non-contributory pensions, 75% of the poverty threshold for a one-person household must be reached.

In the case of minimum pensions, which are represented in the CPLS, the estimation is also performed by establishing the required minimum pension growth and applying it to the 2023 microdata. This results in an increase in the average pension in the system.

Baseline, shorter-delay and longer-delay scenarios

Finally, the impact of taking into account all the changes described above is estimated and compared with a situation in which none of the changes would have occurred. It is necessary to determine, as described in the section on rewards, what the reward and delay structure of the baseline and alternative scenarios will be.

Three scenarios are considered:

- **Baseline scenario**: In 2030, 30% of the population delay retirement. Of these, the percentage of people choosing the lump sum will increase from 18% in 2023 to 35% in 2035.
- **Shorter-delay scenario**: 20% of the population delay retirement in 2030. The percentage of people choosing the lump sum is maintained at 18%.
- **Longer-delay scenario**: 50% of the population delay retirement in 2030. The percentage of people choosing the lump sum increases to 50%.

For all of them, the impact of the reform is a reduction in the average pension, more moderated in the first years by the increase in pensions with a reward.

Finally, this Technical Document focuses on measures affecting expenditure on pensions, not on revenue measures. In the second part of the CPLS analysis, which analyses revenue, a study has been carried out on the adequacy, equity and contribution of the system, which is materialised in the *Technical Document on the analysis of the adequacy, equity and contribution of the pension system. Special attention is paid to the impact of the 2021-2023 reform on the pension system*.

3.2. Model calibration

The results of the micro-simulations have to be **transferred to the cohort model described in Section 2 of this document**. Again, a change in decisions is modelled differently from a change in the average pension.

Decision changes are modelled through a change in labour market exit rates, which translate into changes in participation rates that also affect the macroeconomic scenario.

Changes in the average registration pension are modelled by including coefficients acting on the average pension at three key points in time for the reform. In 2035, the increase in the percentage of people delaying is considered to be completed. Until 2050, the transition period in the years to be calculated for the regulatory base has ended and it is the last year in which the maximum pension grows with the CPI and the maximum base at a real 1.2%. In 2070, the last year of the projection and the year in which the full roll-out of the growth in the maximum pension above the growth in the maximum contribution base will have occurred, which happens from 2051 until 2065.

3.2.1. Participation rates

The decision to retire is closely linked to the labour market, as the majority of exits from the labour market at older ages are due to the decision to retire.

As explained in Section 2.2.1, the cohort model considers that **the registration of retirement exits will converge to labour market exits for those aged 61 and over in 2035**. This makes the link between the two concepts even more direct.

As discussed in Section 3.1.2.1. above, the participation rates need to be modified to reflect the change in expected retirement decisions. In particular:

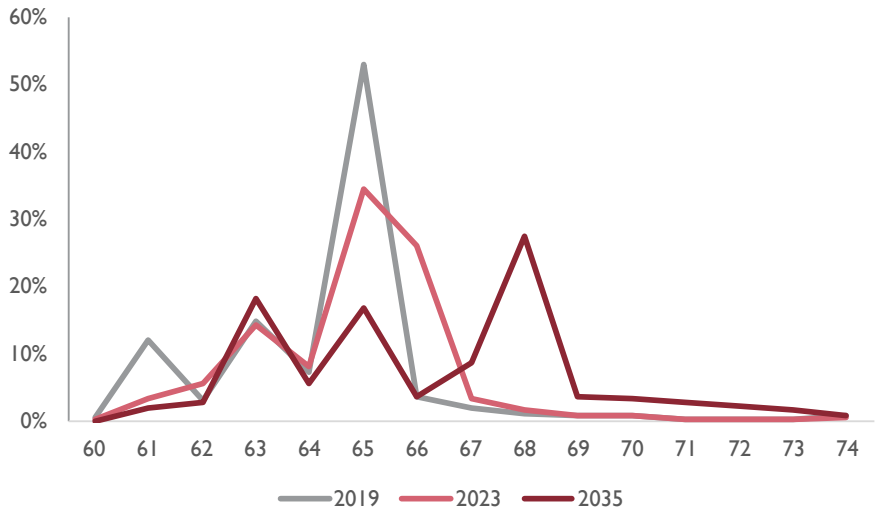
- **Due to changes in decisions to take early retirement**: Reduction in the number of exits at 63 years of age and some increase at 64. Reduction in exits at 63 years of age in exchange for exits at the statutory age.
- **Disappearance of pre-2011 schemes**: Sharp reduction of pre-63 years of age pensions in favour of pensions at 63.
- **Due to increasing the statutory age**: Reduction of exits at 66 years of age in favour of exits at 67
- **Due to increases in delayed retirement**: Reduction of people leaving the labour market between 65 and 67 years of age in favour of people leaving at 68 years of age (around 30%).

Consolidating these changes, the rates of exit from the labour market should evolve in such a way as to **reduce exits before the age of 63, maintaining those at that age as there are counteracting impacts on them. A reduction in exits at 65, 66 and 67 years of age is also expected in favour of exits at 68**.

In 2019, exits from the labour market were concentrated at the age of 65, due to the low number of people delaying retirement combined with the statutory retirement age - 65.7 years of age rounded down - remaining at 65 years of age. Exits at 61 years of age were also common. In 2023, we see a drop in retirements before the age of 63, a shift to the right of the statutory retirement age and an increase in exits from the age of 66. In 2035, under the assumptions

described above, there is a greater reduction in the number of exits before the age of 63, exits at ages between 63 and 65 are maintained, and a reduction in exits between 65 and 67 in favour of departures at the age of 68.

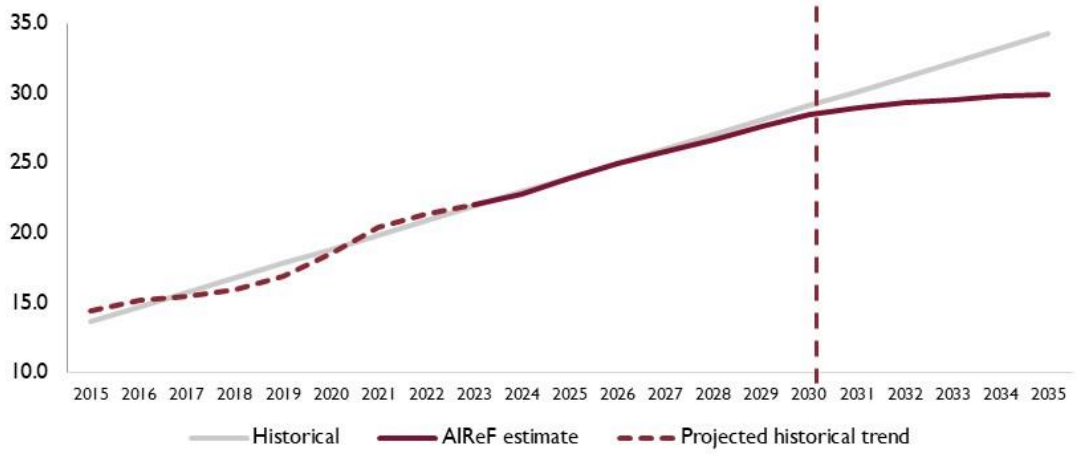
FIGURE 7. EVOLUTION OF LABOUR MARKET EXITS



Source: Labour Force Survey (EPA) and AIReF

This structure of exits is equivalent to **an increase in participation rates for the over-60s that follows the historical trend from 2023 to 2030**, at which point AIReF's estimate considers that the historical trend would be exhausted and participation rates would stabilise.

FIGURE 8. EVOLUTION OF THE PARTICIPATION RATE OF THE OVER-60S



Source: EPA and AIReF

3.2.2. Impact on average pensions and expenditure

As indicated above, the modification of the rules for estimating the initial pension, as well as the evolution of certain assumptions such as the maximum bases or the maximum pension, **have an effect on the amount of the average pension of new registrations**. This effect, which is specified in the following section, has to be introduced in the cohort model.

In addition, the increased expenditure due to the lump sum must also be taken into account. Choosing the lump sum has a dual effect. Firstly, it reduces the initial pension. Secondly, it increases expenditure on pensions in that year. Both effects have to be taken into account and introduced into the cohort model.

The impact on the initial pension is incorporated through correction coefficients at **three points in the projection**:

- **In 2035**, the impact of the increase in delayed retirement is considered to be completed.
- **In 2050**, the transition period for the calculation of years for the regulatory base has ended and this is when the maximum bases cease to grow above the maximum pension.
- **In 2065,** this is when the maximum pension ceases to grow above the maximum bases.

In a first step, the average pension of the registrations is estimated as specified in equation [7]. In a second step, the value of the average pension of the registrations at the three points in time is calibrated with the coefficients obtained. Finally, the change between the indicated dates is linearised.

$$PmIniA_t^e = PmA_{t-1}^{e-1} * (1 + \Delta prod_t + \Delta IPC_{t-3}) \qquad [23]$$

And for t =2035, 2050 and 2065:

$$PmFinalA_t^e = PmIniA_t^e * Coef_t \qquad [24]$$

With regard to the lump-sum payment, the microsimulations estimate the weight of lump-sum payouts (under different assumptions on the percentage of people who delay retirement and who choose or do not choose the lump-sum payment) with respect to the annual cost of pensions for that year (IncPU). This variable is generated for each year of the projection, but is not distinguished by age. This is introduced in the cohort model through a variable that estimates the expenditure by lump sum as that percentage times the monthly cost of new retirement registrations and for 14 months.

$$GtPU_t^e = 14 * IncPU_t * PmAJub_t^e * AJub_t^e \qquad [25]$$

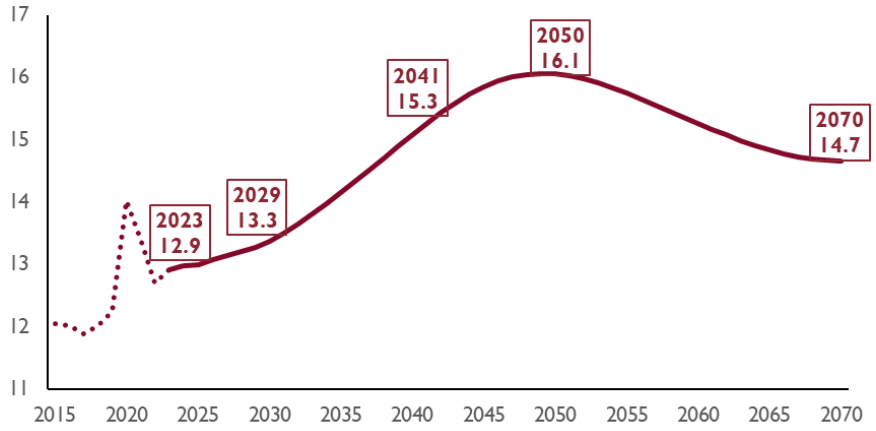
4. DETAILED RESULTS

The baseline scenario is defined as one in which the 2021-2023 legislation is applied, considering that the weight of people delaying retirement will increase from 11% at the start of 2025 to 30% by 2030. It is also considered that the percentage of people selecting the lump sum will increase from 18% in 2023 to 35% by 2035.

4.1. Expenditure on pensions

AIReF estimates that total expenditure on pensions in the baseline scenario will increase from 12.9% to 16.1% of GDP between 2023 and 2050 and then fall to 14.7% by 2070. Total pension expenditure includes pensions under the Social Security system, civil servants' pensions and non-contributory pensions. The growth in pension expenditure is mainly explained by demographic evolution, which determines that the old-age dependency ratio, defined as the ratio of those aged 66 and over to the population aged 16 to 66, will rise from 26% in 2023 to a peak of 49% in 2053 and moderate slightly thereafter to 45% in 2070. This evolution implies that there will be 3.9 people of working age for every person over 66 at the start of the period to two people in 2050.

FIGURE 9. EVOLUTION OF PENSION EXPENDITURE (% GDP)



Source: IGAE, Social Security and AIReF

Expenditure on civil servants' pensions reflects the evolution of a scheme being phased out, with a decrease in the weight of GDP from 1.4% in 2023 to 0.3% in 2070. Although the system has been closed to new entrants since 2011, at the start of the projection horizon the ratio to GDP is maintained and even increases because, although there are no new contributors, the number of pensions and the average pension continue to rise. From 2035 onwards, expenditure over GDP, after reaching a peak of 1.5% of GDP, starts to decline, with expenditure falling to 1.2% in 2050 and 0.3% in 2070.

Expenditure on non-contributory pensions is maintained at 0.2% of GDP over the entire projection horizon. This estimate includes the increase between 2024 and 2027 to cover the poverty thresholds defined in Royal Decree-Law 2/2023, which implies 0.05 points of GDP. From 2028 onwards, the weight of non-contributory pensions over GDP is assumed to remain constant at 0.2%.

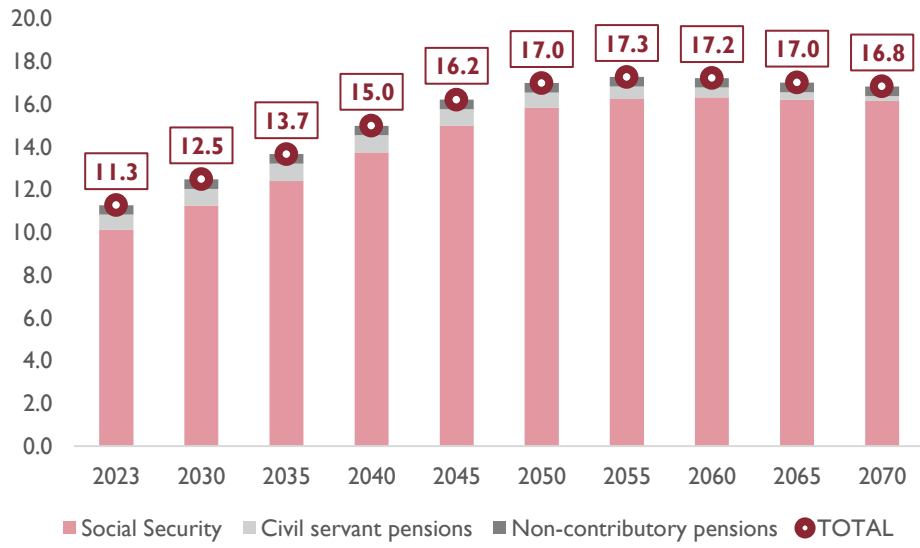
Pension expenditure will grow by more than 4% per annum until 2050, driven by the increase in the number of pensions and the average pension. The growth in Social Security pension expenditure can be broken down into the increase in the number of pensions, the replacement effect and revaluation. Growth in the number of pensions accelerates until 2036, when it exceeds 2%, after which it adopts a downward growth path once the bulk of the baby boom generation has retired, and even declines as from 2060. As a result, pension expenditure growth moderates to hover around 3% as from 2050.

4.2. Number of pensions

The number of pensions rises from 11.3 million in 2023 to a peak of 17.3 million in 2056. Thereafter, the number starts to fall as civil servants' pensions disappear without being compensated by an increase in Social Security

pensions. The number of pensioners evolves in the same way, as the ratio of pensioners to pensions is stable at around 0.9.

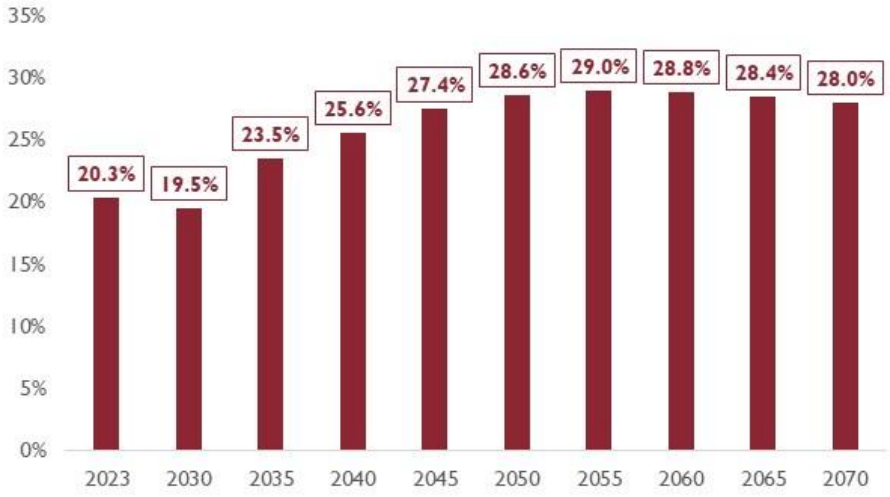
FIGURE 10. EVOLUTION OF THE NUMBER OF PENSIONS (MILLIONS)



Source: Social Security, Civil Servants Scheme and AIReF

This increase in pensions translates **into an increase in the weight of pensioners in the population**, after a slight rise until 2030 from 20% to a peak of 29% in 2055. Thereafter, the ratio moderates, ending at 28% in 2070. For the over-60 age group, the ratio will increase by 10 points, from 27% to 37%.

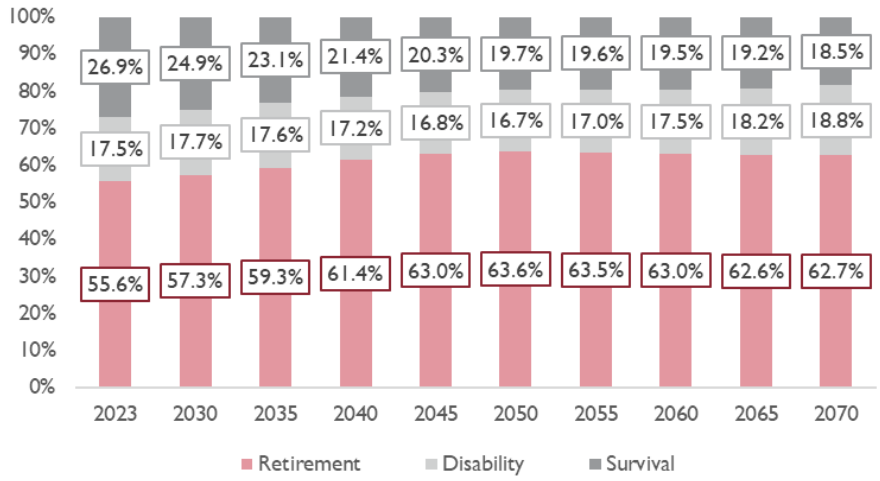
FIGURE 11. PROPORTION OF PENSIONERS AMONG THE POPULATION



Source: Social Security and AIReF

Analysing by type of pension, **the weight of retirement and disability pensions increases at the expense of survivors' pensions**. Within survivors' pensions, it is the widow's and widower's pension that sees the largest drop in weight, from 22% to 16% in 2070.

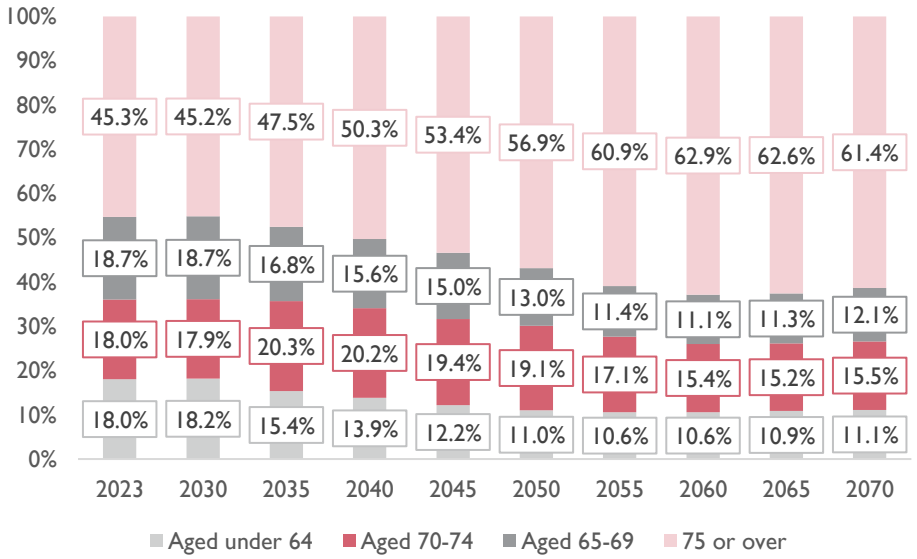
FIGURE 12. TYPE OF PENSION. WEIGHT OF TOTAL PENSIONS (SS AND CIVIL SERVANTS SCHEME)



Source: Social Security, Civil Servants Scheme and AIReF

With regard to the age distribution, population ageing **pushes the weight of pensions for people aged 75 and over from 45% in 2023 to a maximum of 63% in 2060**. Thereafter, it starts to moderate, with the weight of pensions for those aged 75 and over falling to 61%.

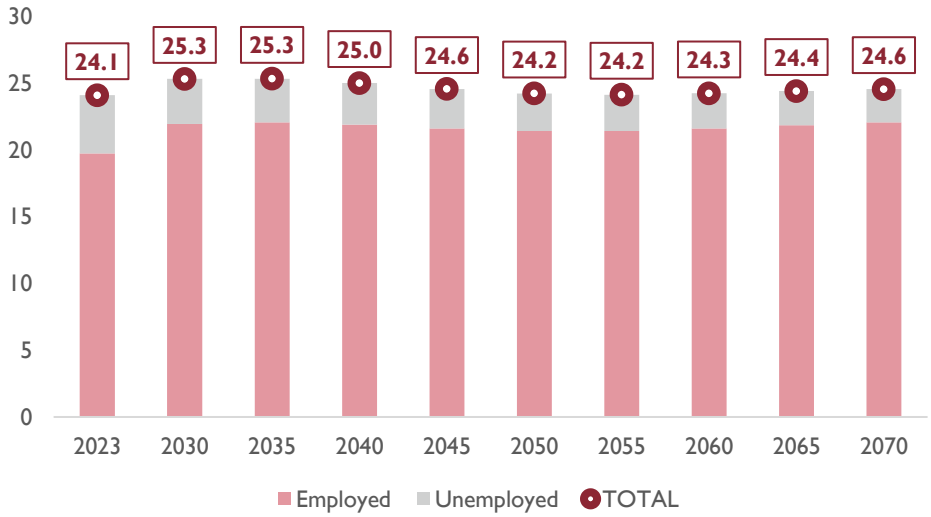
FIGURE 13. DISTRIBUTION OF PENSIONS BY AGE GROUP (SS AND CIVIL SERVANTS SCHEME)



Source: Social Security, Civil Servants Scheme and AIReF

The number of contributors increases until 2035 to reach 25.3 million. Thereafter, it starts a downward path until the 2060s, when it begins to recover. Unemployment contributions decline throughout the projection horizon.

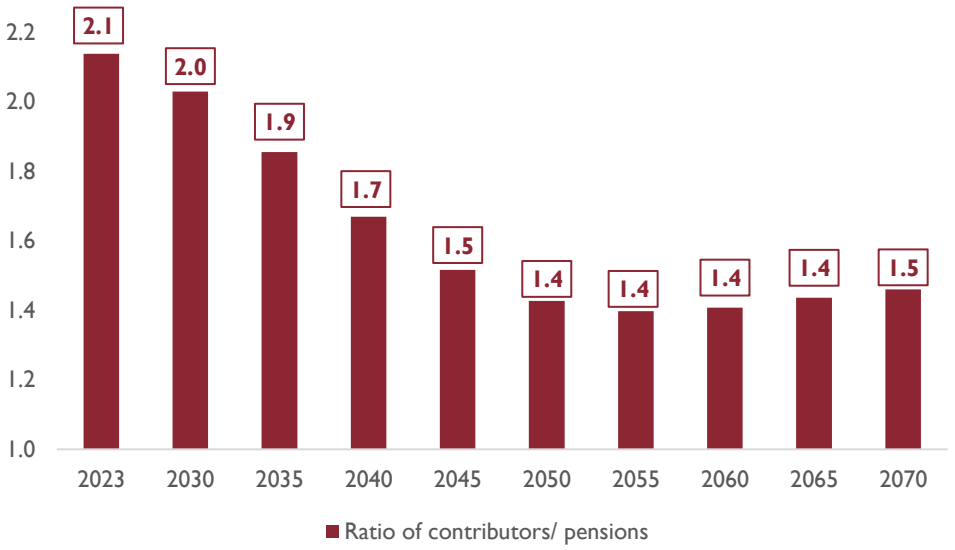
FIGURE 14. EVOLUTION OF THE NUMBER OF CONTRIBUTORS



Source: Social Security and AIReF

The opposite evolution of the number of pensions and the number of contributors leads **to the ratio of contributors to pensions falling from 2.1 in 2023 to 1.4 in the 2050s.** Thereafter, a certain recovery begins, ending with a ratio of 1.5 in 2070.

FIGURE 15. CONTRIBUTIONS / PENSION RATIO

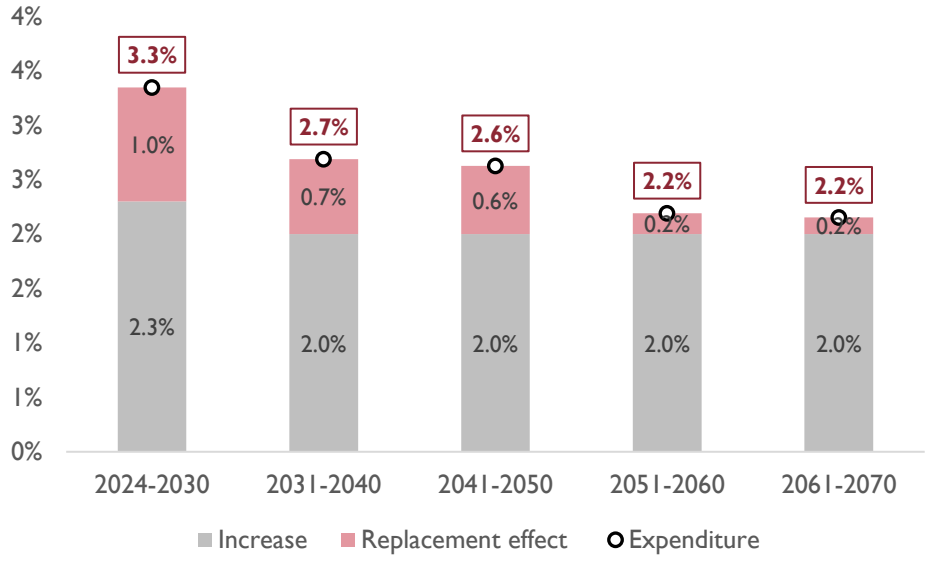


Source: Social Security, Civil Servants Scheme and AIReF

4.3. Average pension

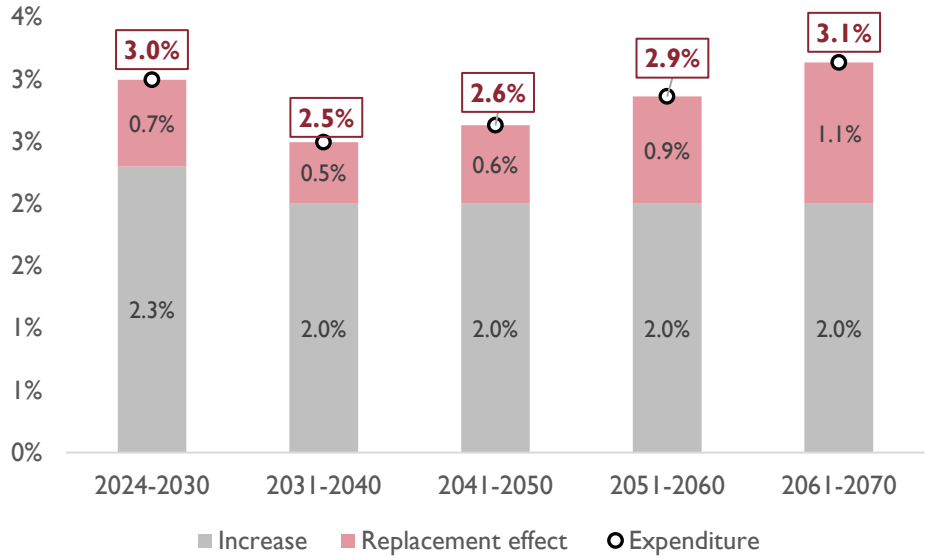
The **average pension grows in line with the pension revaluation, which is common to Social Security and civil servants' pensions, and the replacement effect.** In this case, the replacement effect is higher for civil servants' pensions until 2050, and is considerably lower thereafter, due to the abolition of the scheme.

FIGURE 16. EVOLUTION OF THE AVERAGE PENSION. CIVIL SERVANTS SCHEME



Source: Civil Servants Scheme and AIReF

FIGURE 17. EVOLUTION OF AVERAGE PENSION. SOCIAL SECURITY

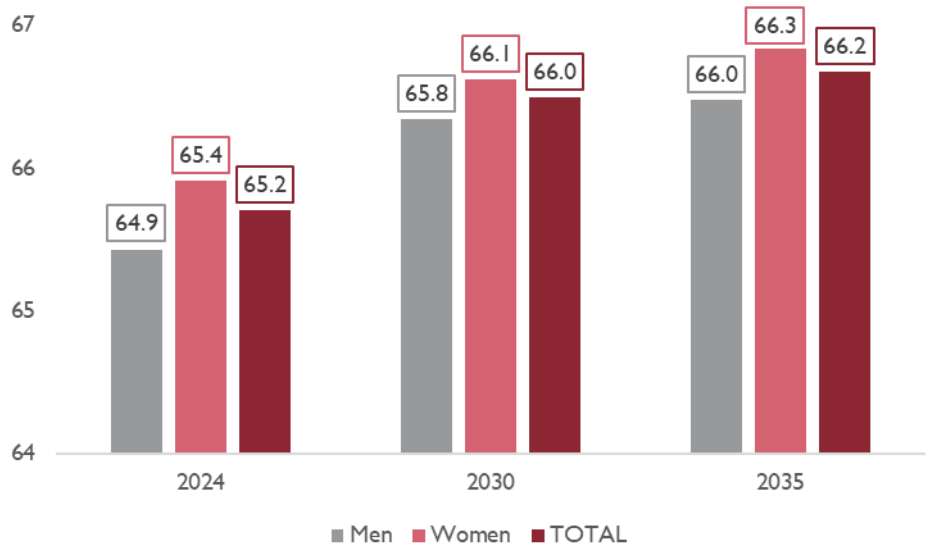


Source: Social Security and AIReF

4.4. Effective retirement age

The effective retirement age of Social Security pensioners **increases from 65.2 years of age in the latest available data to 66.2 in 2035.** The increase in the effective retirement age is somewhat higher for men (slightly more than 1 year) than for women (slightly less than 1 year). Almost all of the age increase is consolidated in 2030, at which point the reforms are considered to have almost fully taken effect.

FIGURE 18. EFFECTIVE RETIREMENT AGE. SOCIAL SECURITY PENSIONS



Source: Social Security and AIReF

5. IMPACT OF THE REFORM

This section describes in detail the simulations performed and specifies the impact of each simulation on the average pension and the pension expenditure path. The number of pensions will only be affected by demographic variables or changes in participation rates. All the scenarios described in this section are simulated on the cohort model with the participation rates of the baseline scenario, except for the shorter and longer retirement delay simulations, in which case the impact on the number of pensions will be specified.

The assessment of the impact of the reform is carried out on a scenario in which the reform is not implemented.

5.1. Revaluation of pensions in line with the CPI and repeal of Sustainability Factor

The impact of these reforms is measured directly with the cohort model, because none of them affect individuals differently, so microsimulation would give the same results as applying it to the cohort model, which is based on group averages.

In the case of the Pension Revaluation Index, the average pension in 2050 would be 20% lower than in the baseline scenario. In the case of the Sustainability Factor, not having repealed it would result in an average pension almost 7% lower at that date.

In terms of expenditure, the Pension Revaluation Index reduces expenditure in 2050 by 2.7 points of GDP, while maintaining the Sustainability Factor would reduce it by 1 point.

5.2. New structure of penalties

The 2021-2023 reform modifies the structure of penalties, increasing the differentiation between individuals. The penalties will become monthly instead of quarterly. They will depend not only on the number of months of early retirement, but also on the number of months of contributions made by the individual.

When comparing the old and new penalties, except for very long periods of contributions made for which the new penalties are always less prejudicial, the new penalties are more permissive except for those who take early retirement by almost the two years allowed or those who take early retirement by only three months. In these two groups, the new penalties reduce the pension by a higher percentage.

In addition, the reform establishes that the penalties will be applied to the estimated pension instead of the regulatory base. This means that for maximum pensions, the penalty will have a more pronounced effect, given that under the previous legislation, if the regulatory base was much higher than the maximum pension, the pension after the penalties in many cases continued to be the maximum pension.

To measure the impact of this reform, **the resulting pension under the old and new penalty structure is compared**. In this case, if the impact is assessed with the 2021 CPLS, the impact is a reduction of just under 1% in 2050, mostly due to the application of the penalties on the pension instead of on the regulatory base. However, when assessing the measure with the 2023 CPLS, as there has been a change in behaviour, the impact of the measure is an increase in the average pension of around 1% and the application of the penalties on the pension instead of the regulatory base has hardly any impact, due to the fact that there are almost no maximum pensions that have been brought forward.

If this impact of the average pension is transferred to the cohort model, there is no significant change in the expenditure path, with or without a change in agents' behaviour.

5.3. New reward structure

The 2021-2023 reform modifies the reward structure in two ways. On the one hand, the **option of obtaining an increase in the average pension** from the

start will no longer depend on the number of months of contributions, but will in any case be 4% for each full year of delayed retirement[12]. In addition, the **possibility of obtaining a lump-sum payment** upon retirement is established, depending on the pension the individual is entitled to, varying in 2022 from around €5,000 to around €12,000 for each year delayed. In 2023, the proportion of people delaying that select the lump sum is 18%, slightly higher than in 2022 (around 15%).

The impact of this reform is a slight increase in the average pension in the case of everyone choosing the pension increase and a decrease in the average pension in the case of everyone choosing the lump sum. If the percentage of people delaying retirement is maintained, even though between 2021 and 2023 it has increased from 5% to 8%, the impact on the average pension and on expenditure is very limited, a 0.03% increase in the pension if they choose the pension increase and a 0.2% reduction if they choose the lump sum. In the case of the lump sum, the weight of lump sum payouts in terms of pension costs is also estimated to be an additional cost on expenditure of around 1% of the cost of pension registrations. Introducing these changes in the average pension and the increase in the total cost of the lump sum, the impact on expenditure is zero.

In the case where the percentage of people delaying retirement is the percentage established for the baseline scenario (30%), the impact of the change in rewards if everyone chooses the pension increase will be an increase in the average pension of the registrations by 1.3%. If all choose the lump sum, the impact on the initial pension will be a reduction in the pension of 0.45% and the dead cost on expenditure increases to 5%. Under these assumptions, the impact on total pension expenditure is an increase of almost 0.1 points in the case of choosing the average pension increase and practically zero in the case of the lump sum.

5.4. Years of calculation of the regulatory base

The reform also **modifies the number of years used to calculate the regulatory base from the last 25 currently in force to the best 27 of the last 29.** It establishes a transition period until 2045, in which the most beneficial system will be applied to each individual.

When comparing Spanish legislation with our peer countries, it can be seen that **we are one of the countries that include the fewest years in this**

[12] The rules are being changed so that rewards will be earned for every six months of delay.

calculation, with a very common option being to consider the whole of each person's period of contributions made.

TABLE 2. YEARS OF CALCULATION FOR THE ESTIMATION OF THE RETIREMENT PENSION. COMPARISON

Country	Reference period
Spain	Last 25 years
Germany	Full career
France	Best 25 years
Italy	Full career
Netherlands	Years of residence
Portugal	Best 40 years

Source: Ageing Report. Country fiches

The impact on the average pension of this measure has to be divided into the transition period and the following years. In the transition period, the impact is a very slight increase in the average pension (around 0.02%). Once the transition period is over, the pension will be reduced by just over 1%. The impact on expenditure will be almost 0.1 points in 2070.

The option of taking into account the entire period of contributions made by individuals is also simulated. In this case, the impact on the average pension is about 15%, which translates into a reduction in expenditure of almost 1 point of GDP in 2050.

5.5. Contribution bases and maximum pensions

The 2021-2023 reform also establishes a different evolution of the maximum contribution bases and the maximum pension. Specifically, the maximum contribution bases will grow by 1.2 points above the CPI, while the maximum pensions will grow with the CPI plus 0.12% until 2050. Thereafter, the maximum contribution bases will grow in line with the CPI and a growth path in the maximum pension is established that will increase it by around 60% between 2051 and 2065.

This has two effects. Until 2050, under the assumption that contribution bases evolve in line with wages, an increasing number of pensions will be capped as the regulatory base is higher than the maximum pension in more cases. This leads to a reduction in the average pension in the system, compared with a scenario in which this reform is be applied. In addition, the increase in the maximum bases will lead to an increase in revenue that does not translate into

an increase in expenditure. From 2050, the effect is reversed. At that time, under the assumption that the average registration pension evolves with wages and the maximum pension with the path approved, the proportion of maximum pensions would have increased from around 6% to more than 15% of the total. Between 2050 and 2065, the percentage is slightly reduced, but since the growth path for the maximum pension in that period is not much higher than wage growth, there is no major reduction.

The impact of this change on the average pension increases over time, reducing the pension by about 2% by 2035 and by more than 5% by 2050 compared with a scenario without this reform. This trend is slightly reduced in the last few years. This translates into a **growing impact on expenditure until 2050, reaching 0.4 points of GDP** at that time.

5.6. Increase in minimum and non-contributory pensions

The reform also establishes that **minimum and non-contributory pensions must increase until 2027 at a rate that allows the former to reach the poverty threshold and the latter to reach 75% of the same**[13]. In AIReF's estimate, this translates into an increase in these pensions of around 7% per annum.

The impact of the measure on the average pension, estimated from microdata, is an increase in the average pension of just over 1%. The estimated expenditure impact of the measure, also including the increase in non-contributory pensions, is an increase in expenditure of 0.1 points of GDP in 2027, an increase that is maintained over time.

5.7. Baseline scenario, shorter delays and longer delays

First, the impact on the pension of implementing all the approved reforms without any change in the behaviour of individuals is measured. The impact is also simulated when 20% delay retirement, when 30% delay retirement (baseline scenario) and when 50% delay retirement. The lump-sum payment will remain at 18% in the first case, increase to 35% in the baseline scenario and rise to 50% in the third. The impact on the average pension and the increase in total expenditure due to the lump sum can be seen in the following table.

[13] Minimum pensions with a dependent spouse should be increased to reach the poverty threshold for a two-person household. Non-contributory pensions should be increased to 75% of the poverty threshold for a one-person household.

TABLE 3. IMPACT ON THE AVERAGE PENSION AND COST OF THE LUMP-SUM PAYMENT OF DIFFERENT SCENARIOS

	Lump sum		Impact on average pension		
	% choosing lump sum	Impact of lump sum	2035	2050	2065
Scenario without delay	18.0%	1.4%	-2.0%	-5.1%	-5.2%
Scenario with 20% delaying	18.0%	3.1%	-1.1%	-4.5%	-4.6%
Baseline scenario	35.0%	7.9%	-0.9%	-4.1%	-4.2%
Scenario with 50% delaying	50.0%	16.9%	0.3%	-3.1%	-3.1%

Source: AIReF

The impact on expenditure is estimated from these simulations**, combining the participation rates that correspond to the impact on the average pension and the lump-sum payment.** We find that the impact of delaying retirement by 20% is about 0.6 points in 2050, delaying retirement by 30% improves expenditure by 0.8 points, while delaying retirement by 50% improves expenditure by 1.2 points.

In this case, there is an **impact on the number of pensions.** In the 20% delayed retirement scenario, there will be 100,000 more pensions than in the baseline scenario in 2050, and in the 50% delayed retirement scenario there will be 100,000 fewer pensions.

6. CONCLUSIONS

AIReF uses a cohort model that employs historical data to estimate the evolution of expenditure on pensions taking into account the evolution of demographics. This model has been reinforced with a microdata analysis through which deviations from historical patterns are determined. These deviations may be due to behaviour or changes in the average pension.

Changes in agents' behaviour refer to changes in their retirement decision compared with historical decisions. These changes are observed through analysis of the CPLS from one year to the next. Based on the historical evolution, assumptions are made about the continuity or otherwise of what has been observed. These assumptions are simulated with the microdata and the impact on the effective retirement age is obtained. Using the close relationship between the labour market participation rate at older ages and the effective retirement age, these changes are introduced into our cohort model through changes in participation rates.

Changes in the average pension refer to the impact of a reform in legislation that modifies the way in which the pension is calculated. These changes are modulated by simulating the different legislation on the characteristics that the CPLS offers us of the individuals and observing the change resulting from the different calculations on the final result.

The impact of the pension reforms undertaken between 2021 and 2023 is an increase in expenditure of 2.7 points of GDP in 2050, and an increase of more

than 20% in the average pension by the same date. The repeal of the Pension Revaluation Index and the Sustainability Factor are key to these changes. Second, the change in individual behaviour becomes important, with the percentage of people delaying retirement rising to 30% in 2030, reducing expenditure by 0.8 points of GDP in 2050 due to higher participation rates among the elderly. The capping of the maximum pension also has a significant impact, although the channel of this measure is more through the impact on the average pension.

TABLE 4. IMPACT OF PENSION REFORMS BETWEEN 2021 AND 2023 ON EXPENDITURE ON PENSIONS IN 2050 AND THE AVERAGE PENSION

	Expenditure			Average pension
	2023	2050	2070	2050
Cumulative change	**0,5**	**2,6**	**2,1**	
Increase in pensions with the CPI (elimination of IRP)	0,6	2,7	2,3	+20%
Elimination of Sustainability Factor	0,0	1,0	1,6	+7%
Early retirement				-1%/+1%
Incentives for delayed retirement	-0,1	-0,8	-1,3	-0.5%/+1.3%
Determination of years for calculating entry pension			-0,1	-1.0%
Evolution of maximum pension different from maximum contribution bases		-0,4	-0,4	-5.0%
Evolution of minimum and non-contributory pension	0,1	0,1	0,1	+1%

Source: Social Security and AIReF

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