Economic Policy Committee - Ageing Working Group

2024 Ageing Report

Spain's Country Fiche

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Introduction

The present country fiche for Spain is part of the 2024 Ageing Report, which provides long-term projections of the economic and budgetary impact of population ageing at unchanged policy. The 2024 edition is the eighth update and covers the period up to 2070.

This fiche was prepared by the General Directorate for Macroeconomic Analysis from the Ministry of Economic Affairs. The pension projections presented in this fiche incorporate the macroeconomic assumptions and methodologies agreed within the *Ageing Working Group* of the *Economic Policy Committee*. Given the process of preparing budgetary projections, there is an unavoidable discrepancy between these assumptions and the latest available macroeconomic data for 2022 and 2023 at the time of the submission of the pension projections, which affects the expenditure-to-GDP ratio. Box 3.5.A of this fiche specifically addresses this issue and presents a scenario based on the latest updated macroeconomic information at the time of the finalisation of this fiche, early December 2023. The projections have been peer reviewed by the other Member States and the European Commission within the *Ageing Working Group*. The projections were finalised in the autumn of 2023 and represent the situation of the pension system on 01/12/2023.

Section 1 provides a general overview of the pension system in Spain. Section 2 describes the demographic and labour market assumptions underlying the pension expenditure projections presented in Section 3, which also discusses the sensitivity scenarios around the baseline. Finally, Section 4 gives an overview of the model used to produce the pension projections, with complementary data provided in the methodological annex.

1. Overview of the pension system[1]

1.1. Description of the pension system

The Spanish pension system is based on a public and mandatory system. Private pension schemes do exist, but they are of a voluntary nature and usually play the role of complementary savings sources for retirement.

The main component of the public pension system is the general regime of the Social Security system. Additionally, a special scheme covers the Civil Service, the judiciary, the military, and police forces ('*Clases Pasivas*'), although it is closed to new entrants since 2011. Both systems are mandatory, earnings-related and defined benefit schemes. They cover three types of pensions: old-age, disability, and survivors (widows, orphans and '*favor de familiares*'[2]). Finally, the public pension system is complemented by a non-earnings-related scheme.

This section describes the main features of each of these systems: coverage and funding, eligibility requirements, rules for calculating each benefit and indexation rules.

1.1.1. Coverage and funding of the system

The Social Security system is a mandatory, pay-as-you-go system. It covers employees in the private sector and those in the public sector who have not joined the system of *Clases Pasivas*, and the self-employed[3]. *Clases Pasivas* covers civil servants at the central, regional, and local governments and the military. This system has been closed to new entrants since 1-1-2011 and will progressively phase-out, with new civil servants joining the Social Security system since then. The non-earnings-related basic scheme is granted to people with income below a threshold set every year in the Budget Law (annual €5,899.60 in 2022 for the basic amount). Table 1 summarizes the main figures of the three components in the base year 2022.

TABLE 1 – COMPONENTS OF THE SPANISH PENSION SYSTEM. YEAR 2022

	Expenditure (% GDP)	Share of total public expenditure in pensions (%)	Number of pensions (1,000)	Share of total number of pensions (%)
General regime Social Security system	11.4	87.5	9922.0	89.7
Clases Pasivas	1.4	10.8	692.2	6.3
Non-earnings related system	0.2	1.7	444.5	4.0

Source: Spanish General Directorate for Macroeconomic Analysis

Special pensions are public pensions which are allocated based on occupational activities or special status and which are deemed more advantageous than the general scheme. Pensions provided to firefighters, army officers, police officers, miners, seamen and to civil servants are included in this category. Table 2 and Table 3 summarize the prevalence of special pensions and its comparison to the previous Ageing Report.

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[1] For an exhaustive description of pension schemes, please see the PENSREF database.

[2] In the 2021 Ageing Report '*favor de familiares*' pensions were included under the 'other pensions' category.

[3] The self-employed are covered by a special scheme inside the Social Security system. Other minor special schemes exist for certain economic activities (miners, seamen, domestic employees).

Reference year and publication	Special pension expenditure				Public pension expenditure
	Total available	Difficult conditions	Security and defence	Other	
2019 in AR 2021	1.7	0.4	0.3	1.0	12.3
2022 in AR 2024	1.7	0.3	0.3	1.1	13.1

TABLE 3 – SPECIAL PENSION ACROSS AR ROUNDS, % OF PENSIONERS COVERED

Reference year and publication	Total available	Difficult conditions	Security and defence	Other
2019 in AR 2021	8.5	2.4	1.8	4.3
2022 in AR 2024	8.7	1.8	1.7	5.2

Source: Spanish General Directorate for Macroeconomic Analysis

Social Security pensions are funded through contributions (from employers, employees, the self-employed and part of the unemployed[4]). Additionally, since 2023, resources collected by the Intergenerational Equity Mechanism[5] (MEI by its Spanish acronym) are used to fund the pension system's Reserve Fund. As of 2033, the accumulated Reserve Fund's resources will be used to partially fund earnings-related pensions. Finally, the Central Government transfers additional resources to fund certain benefits and expenses, top-up minimum pensions and bridge annual financial deficits. Pensions from the *Clases Pasivas* system are funded through contributions paid by civil servants and the military and through direct payments made by the Central Government. Non-earnings-related benefits are funded through direct transfers from the Central Government (see Section 3.4 for additional information on the financing of the system). Pension benefits are taxed as labour income, except for benefits to some disability pension types[6].

Private pension schemes are voluntary systems offered by financial and insurance institutions as complementary savings products. These schemes can be grouped into individual and occupational pension funds (61% individual and 39% occupational of total private pension funds' assets in 2022). Individual private plans are funded and mostly defined-contribution schemes. Occupational pension plans cover occupational plans and collective pension insurance plans (with retirement benefit purposes). Occupational private pension schemes are offered in the context of labour bargaining between employers and employees. They are usually financed by employers and employees. Private pension benefits are also taxed as labour income. Contributions to private pension plans are taxed following the ETT principle (Exempt contributions, Taxed investment income and capital gains of the pension institution, Taxed benefits) except for collective insurance plans, that do not enjoy tax exemptions. Private pensions amount to 0.3% of GDP in 2022, of which 0.2% are occupational pensions.

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[4] All unemployed receiving benefits, and subsidies if aged over 52.
[5] See chapter 1.2.
[6] Absolute, permanent and great disability pensions, see PENSREF database.

1.1.2.   Eligibility requirements

<u>Social security system</u>

Earnings-related old-age pensions are granted to workers who meet two requirements:

- Having contributed for at least 15 years, of which at least 2 years of contributions must have taken place in the 15 years prior to the statutory retirement age.

- Having reached the statutory retirement age, which in turn depends on the number of years of contributions. The general statutory retirement age is currently being extended by 2 months per year until 2027, when the statutory retirement age will be set at 67. Those workers having contributed for at least 38.5 years will be able to retire with a full pension at 65.

Workers can retire before and after the statutory retirement age, within certain age limits and requirements and subject to a bonus/malus scheme. Early retirements can be voluntary, involuntary, and partial:

1. Workers can apply for voluntary early retirement up to 2 years before reaching the statutory retirement age, they have contributed for at least 35 years and the computed benefit is greater than the minimum pension benefit.

2. Involuntary early retirement is aimed at workers who lose their job through collective dismissals. To be eligible to receive the pension benefit, they must be no more than 4 years below the statutory retirement age and must have contributed to the system for at least 33 years.

Pension benefits for early retirement are penalized depending on the worker's number of years of contributions, the difference with the statutory retirement age and the nature of the early retirement (voluntary or involuntary). These penalties are summarized in Table 4.

TABLE 4 – MAXIMUM PENALTY TO EARLY RETIREMENT[7]

	Length of the worker's contributory profile (years)			
	<38.5 years	38.5-41.5	41.5-44.5	>44.5 years
Involuntary early retirement	30%	28%	26%	24%
Voluntary early retirement	21%	19%	17%	13%

Source: Spanish General Directorate for Macroeconomic Analysis

3. Early partial retirement is available for workers of different ages depending on the number of years of contributions. The age of early partial retirement in 2027 will be 63 for contribution profiles longer than 36.5 years, and 65 for contribution profiles between 33 and 36.5 years. Below 33 years of contribution early partial retirement is not allowed.

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[7] The penalty increases with each month of anticipation. Table 4 shows the maximum penalty, which takes place 48 months before the statutory retirement age for involuntary early retirements and 24 months before the statutory retirement age for voluntary early retirements. See chapter 1.2 for additional information.

Retirement beyond the statutory age is incentivized through premiums for every extra year of work. Workers can opt for a 4% increase for each year of delay in their initial pension benefit, for a lump-sum amount or for a combination of both. The lump-sum amount depends on the length of the worker's contributory profile (see chapter 1.2 for additional information). The resulting benefit can be higher than the maximum pension.

TABLE 5 – QUALIFYING CONDITIONS FOR RETIREMENT

			2022	2030	2040	2050	2060	2070
Qualifying condition for retiring **with** a full pension		Statutory retirement age - men	66yr2mo	67	67	67	67	67
		Statutory retirement age - women	66yr2mo	67	67	67	67	67
	Minimum requirements	Contributory period - men	37yr6mo	38yr6mo	38yr6mo	38yr6mo	38yr6mo	38yr6mo
		Retirement age - men	65	65	65	65	65	65
		Contributory period - women	37yr6mo	38yr6mo	38yr6mo	38yr6mo	38yr6mo	38yr6mo
		Retirement age - women	65	65	65	65	65	65
Qualifying condition for retirement **without** a full pension		Early retirement age - men	64yr2mo or 63	65 or 63	65 or 63	65 or 63	65 or 63	65 or 63
		Early retirement age - women	64yr2mo or 63	65 or 63	65 or 63	65 or 63	65 or 63	65 or 63
		Penalty in case of earliest retirement age	21%	21%	21%	21%	21%	21%
		Bonus in case of late retirement	4% x compl yr	4% x compl yr	4% x compl yr	4% x compl yr	4% x compl yr	4% x compl yr
		Minimum contributory period - men	15	15	15	15	15	15
		Minimum contributory period - women	15	15	15	15	15	15
		Minimum residence period - men	:	:	:	:	:	:
		Minimum residence period - women	:	:	:	:	:	:

Source: Spanish General Directorate for Macroeconomic Analysis

Disability pension benefits take into account the level and the cause of disability, the worker's age and whether the worker is currently employed and paying contributions to the system. For statistical purposes, once pensioners benefiting from a disability pension reach 65 years of age, their pensions are registered as old-age retirement pensions.

Survivors' pensions include widow(er)s, orphans and '*favor de familiares'* pensions. These are earnings-related benefits, as the deceased worker whose relatives can benefit of the pension must meet some contribution requirements. The pension benefit for the widow(er) amounts to 52% of the deceased spouse's pensionable income (in some cases 70%). Pension benefit for orphans is 20% of the parent's pensionable income. For other relatives, the pension benefit amounts to 20% of the pensionable income and can be increased to 52% in the absence of either a widow(er) or an orphan. In all cases, the sum of the benefits granted to the deceased worker's relatives cannot exceed 100% of pensionable income.

Special scheme for the civil service and the military (*Clases Pasivas*)

Workers included in this scheme are eligible for an old-age pension if they are 65 and have contributed for at least 15 years. Early and late retirement are possible. Early retirement is allowed once the worker reaches 60 and has a contributory profile of at least 30 years. Late retirement is allowed until 70 years of age and workers' benefits are increased with a bonus.

Non-earnings-related scheme

This scheme provides old-age or disability pensions to those workers who do not meet the required minimum contributory period to receive a contributory pension. Pensioners of this scheme cannot receive incomes above the maximum permitted threshold[8]. Besides, specific requirements are set for each kind of pension. To be eligible to receive an old-age non-contributory pension they must have a minimum age of 65. In order to receive a disability non-contributory pension, they must be between 18 and 65 years of age with a degree of disability of at least 65%. A minimum period of residence is required in any case. Old-age and disability pensions cannot be combined under this scheme.

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[8] The threshold is determined according to the number of household members.

1.1.3. Rules for calculating old-age pension benefits

The old-age pension benefit in the Social Security system is calculated as a percentage of the computed pensionable income. The computed pensionable income is the average of the last 300 contribution bases. As of 2044, the average of the best 324 contribution bases in the last 348 will be used to obtain the computed pensionable income. The contribution base is equal to the monthly earned income within thresholds (the lower bound depends on the occupational category of the worker and the upper bound is the same for all workers). The average that results in the computed pensionable income is calculated as the sum of the contribution bases of the last 300 months prior to retirement divided by 350[9]. As of 2044, the sum of the best 324 contribution bases in the last 348 prior to retirement divided by 378[10] will be used (see Annex). Contribution bases corresponding to the 24 months prior to retirement are computed in nominal terms, while earlier ones are valorised according to the CPI.

Rules also apply to cover contribution gaps in the worker's profile. Gaps occurring within the 48 most recent months prior to retirement are filled using the minimum contribution base. Gaps further back in time are filled with 50% of the minimum contribution base. Notwithstanding the above, as long as there is a gap of at least 5% between new old-age pension benefits for men and women, contribution gaps will be filled in a different manner. More precisely, gaps in women's[11] contribution profile occurring within the 60 most recent months prior to retirement are filled using 100% of the minimum contribution base. Gaps between the 61 and the 84 most recent months are filled with 80% of the minimum contribution base. Gaps further back in time are filled with 50% of the minimum contribution base, i.e. the general rule.

The Spanish legislation allows to benefit from an earnings-related old-age pension and keep working full time or part time, both as an employee or a self-employed. In these cases, the pensioner must have reached the statutory retirement age, and the pension benefit is reduced to half of the amount the pensioner would receive if he remained retired. Once the labour contract or the self-employed activity is ended, the full benefit is re-established. While working, the pensioner and employer only pay a fraction of contributions.

The accrual rate for the pension benefit depends on the length of the worker's contributory profile. The minimum contributory period (see Table 5) is 15 years. For these shortest contributory profiles, the accrual rate on pensionable income is 50%. Thereafter, the rate increases linearly until the contributory period reaches 38 years and 6 months, in which case the accrual rate is 100% of pensionable income.

The resulting pension benefit is limited by a minimum and a maximum amount. On top of this, a bonus/malus scheme is applied depending on the worker's contributory profile and the difference between his age of retirement and the statutory retirement age.

Old-age pension benefits in the special scheme for the civil servants and the military are calculated with rules very similar to those of the Social Security system. Computable pensionable income depends on the civil servant's professional category and the accrual rate depends on the length of his contributory profile, reaching 100% when the contributory profile is 35 years or more.

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[9] 25 years is equal to 300 months. The sum is divided by 350 because contributions are paid monthly but annual pension benefits are paid in 14 instalments (25 years x 14 = 350).

[10] 27 years is equal to 324 months of the last 29 years or 348 months. The sum is divided by 378 because contributions are paid monthly but annual pension benefits are paid in 14 instalments (27 years x 14 = 378).

[11] Gaps in men's contribution profile receiving the gender gap complement will be filled in the same manner as women's.

1.1.4.   Indexation rules

Pension benefits, as well as the minimum pension amount, are annually revalued according to the average growth rate of the Consumer Price Index in the twelve months before December of the previous year. If this average growth rate is negative, the revaluation rate is zero.

This new mechanism incorporates a smoothed measurement of the inflation rate by using the average of the year-on-year growth rates of the previous twelve months. Besides, biases derived from prediction errors are avoided since the revaluation rate is calculated with observed data.

The maximum pension amount is also annually revalued according to the previous rule. However, from 2025 to 2065 a special rule will be applied (see chapter 1.2).

1.2. Recent reforms of the pension system included in the projections

Since the 2021 Ageing Report many measures have been adopted to ensure the adequacy and sustainability of the pension system. The reforms implemented are based on the recommendations of the Toledo Pact (*Pacto de Toledo*, by its Spanish name) adopted by the vast majority of the Spanish Parliament (see Box 1.2.A).

Measures implemented in the last pension system reform were divided into two different and consecutive packages to address the objectives set in component 30 of the Spanish Recovery, Transformation and Resilience Plan.

The first package of measures came into force in January 2022[12]. The adopted reforms aimed primarily at preserving the purchasing power of pensioners as well as at reducing the gap between the effective retirement age and the statutory retirement age. More specifically:

- *Preserving the purchasing power of pensioners through a revaluation rule based on CPI*. Although the IRP[13] (*Índice de Revalorización de Pensiones*) had not been applied since 2018, it was still the legal revaluation tool under the General Social Security Act. Due to the reform, the IRP was replaced by a CPI indexation rule. Specifically, pension benefits are annually revalued according to the average growth rate of the Consumer Price Index in the twelve months before December of the previous year.

- *Removal of the Sustainability Factor (SF).* The SF was a discounting mechanism applied to new old-age pensions which linked the initial pension benefit to the evolution of the life expectancy at 67 years of age. Although it was approved in 2013, it had never been applied.

- *Implementation of a new incentives scheme aimed at increasing the effective retirement age*. Given the possibility of voluntarily retiring up to two years before the statutory age, there is a gap between the effective retirement age and the statutory retirement age. The bonus/malus scheme which is applied to those retiring after or before the statutory retirement age, respectively, has been adapted to reduce this gap through two channels:

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[12] Ley 21/2021 de 27 de diciembre, de garantía del poder adquisitivo de las pensiones y de otras medidas de refuerzo de la sostenibilidad financiera y social del sistema público de pensiones.

[13] The IRP was determined in function of the projected financial balance of the pension system, with a floor (0.25%) and a cap (CPI+0.5%).

o First, by encouraging workers who retire early to extend or even to complete their entire careers. To do so, the new penalty coefficients are higher for the number of months of anticipation for which early retirements tended to happen more frequently (1-3 and 22-24 months prior to the statutory retirement age). Besides, penalty coefficients are now monthly determined instead of quarterly, increasing marginal gains of postponing the retirement decision by an additional month. Finally, for those whose pension benefit is capped by the maximum amount, penalty coefficients are directly applied to the maximum pension benefit[14].

As an example, Figure 1 depicts the comparison of penalty coefficients before and after reform for a worker that contributed less than 38.5 years and decides to retire voluntary early.

FIGURE 1 – PENALTY COEFFICIENTS BEFORE AND AFTER REFORM IF CONTRIBUTED LESS THAN 38.5 YEARS AND ENTERING VOLUNTARY EARLY RETIREMENT
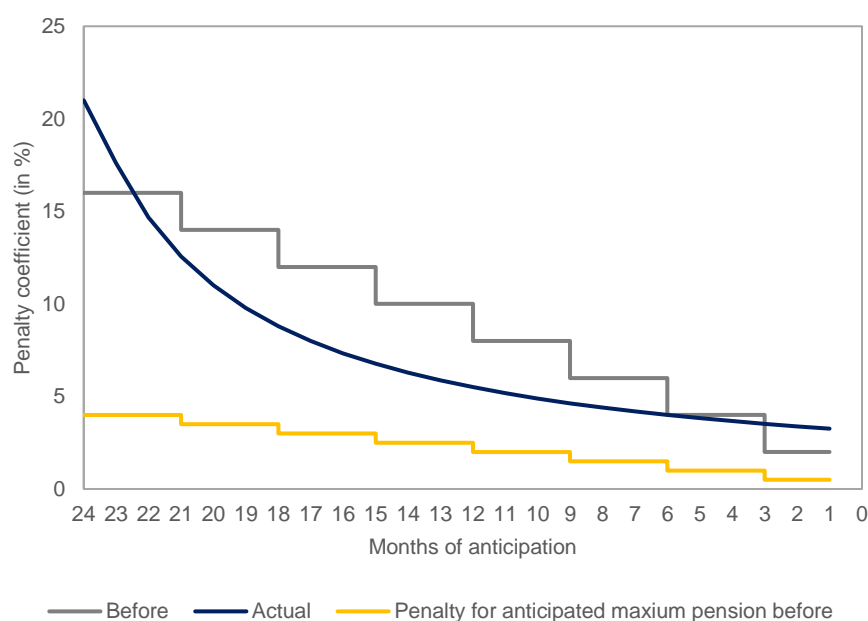
Source: Spanish General Directorate for Macroeconomic Analysis

o Second, by promoting late retirements. Every worker retiring after the legal age is granted a 4% bonus for each year of postponement[15], regardless of the number of years they have contributed to the system. In addition to this option, new legislation introduces the possibility of receiving a lump sum amount instead of the additional monthly percentage. The lump-sum amount depends on the length of the worker's contributory profile as seen below.

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[14] In the preceding Law, penalty coefficients were applied to the regulatory base (after multiplying by the accrual rate). In many cases, this yielded an initial pension still above the maximum pension. If this happened, maximum pension was only reduced by 0.5% for every three months of anticipation (yellow line in Figure 1).

[15] In the preceding law, the bonus depended on how long the worker had contributed to the pension system. If a worker had contributed less than 25 years, he would get a 2% bonus for every complete extended year. If the worker had contributed between 25 and 37 years, he would get a 2.75% bonus. Finally, if the worker had contributed more than 37 years a 4% would be added for every complete year of extension.

If contributed less than 44.5 years, for every complete extra year:

$$Lump\ sum\ amount = 800 \left(\frac{initial\ annual\ pension\ benefit}{500}\right)^{\frac{1}{1.65}}$$

If contributed 44.5 years or more, for every complete extra year:

$$Lump\ sum\ amount = 880 \left(\frac{initial\ annual\ pension\ benefit}{500}\right)^{\frac{1}{1.65}}$$

The underlying rationale of the scheme is that for some workers an additional percentage might not be as appealing as a lump sum received at the moment of retirement because of heterogeneous levels of impatience in consumption across the population. This new option implies more possibilities of receiving a bonus for the extension of the careers.

Another new option consists of a mix between a lump sum payment and an added percentage, creating an even wider range of options for receiving the extension bonus.

The second part of the reform, aimed at strengthening the sustainability of the pension system, concluded in March 2023[16]. Measures focused mainly on increasing the revenues of the pension system:

- *New contribution system for the self-employed.* In the preceding Law, self-employed workers included in the RETA (*Regimen Especial de Trabajadores Autónomos*) system could freely choose their contribution base[17]. At the beginning of 2022, before the adoption of the new law (RD 13/2022), 85% of the self-employed chose to contribute to the system by paying the minimum base. This configuration entailed lower resources and an erosion of the contributory degree of the system[18]. Under the new law, as of 2032 at the latest self-employed's contribution bases will be determined by their annual incomes. Until then, a gradual system based on different tranches is being deployed.

- *Increase of the maximum contribution base and implementation of a solidarity levy.* The cap to the contributory base is annually revalued at the same rate as non-capped preexisting pensions. From 2024 to 2050 1.2 additional percentage points will be added every year to the mentioned revaluation rate. Besides, as of 2024 a new solidarity levy is being applied to tax incomes exceeding the maximum contribution base.

- *Implementation of the Intergenerational Equity Mechanism (MEI by its Spanish acronym).* From 2023 to 2050 an additional contribution is being obtained through the MEI. Specifically, contribution rates for employers and employees will grow gradually. Resources collected by the MEI will be used to fund the Social Security system's Reserve Fund. As of 2033, the accumulated Reserve Fund's resources will be used to partially fund earnings-related pensions, helping to mitigate the temporary pressure on the system caused by the retirement of the Spanish baby boom cohorts.

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[16] Real Decreto-ley 2/2023, de 16 de marzo, de medidas urgentes para la ampliación de derechos de los pensionistas, la reducción de la brecha de género y el establecimiento de un nuevo marco de sostenibilidad del sistema público de pensiones.

[17] Limited by a cap and a floor.

[18] Many self-employed receive minimum pension benefits once retired due to the low contributions paid during their careers.

- *Extension of the computed pensionable income.* As of 2044, the sum of the best 324 contribution bases in the last 348 prior to retirement will be used to calculate pension benefits (see higher). Until then, a gradual scheme is being applied in which new retirees can choose between the preceding and the current law (see Annex).

- *Increase of the maximum pension benefit*. The cap to the pension benefit is annually revalued at the same rate as pre-existing pensions. From 2025 to 2050 0.115 additional percentage points will be added every year to the mentioned revaluation rate. Therefore, during this period the cap to the pension benefit will grow at a lower rate than the maximum contribution base. To preserve the contributory degree of the system, the cap to the pension benefit will grow at a higher rate from 2051 on. Specifically, from 2051 to 2065 it will grow by 20% in accumulated real terms.

- *Increase of the minimum and non-earnings-related pensions benefit*. From 2027 onwards, the minimum old-age and widow(er) pension benefit for a pensioner with a dependent spouse will not be lower than the poverty line for a household comprising two adults (the poverty line for a single-person household multiplied by 1.5). The gap between the minimum pension benefit and the poverty line will be progressively reduced from 2024 to 2027 (a 20% in 2024, 30% in 2025, 50% in 2026 and 100% in 2027). The rest of minimum pensions benefits will increase in the same period but in a percentage equivalent to 50% of the aforementioned progression. Finally, the non-earnings-related pension benefit will reach in 2027 an amount equivalent to the poverty line for a single-person household multiplied by 0.75, following the same trend as the minimum old-age pension benefit during the same period.

- *Improvement on the integration of contribution gaps for all women and for those men who are eligible to receive a gender gap complement.* In the preceding law, gaps occurring within the 48 most recent months prior to retirement were filled using the minimum contribution base, and gaps farther in time were filled with 50% of the minimum contribution base. Under the current law and as long as there is a gap of at least 5% between new old-age pension benefits for men and women, gaps in women's[19] contribution profile occurring within the 60 most recent months prior to retirement are filled using 100% of the minimum contribution base. Gaps between the 61 and the 84 most recent months are filled with 80% of the minimum contribution base. Gaps further back in time are filled with 50% of the minimum contribution base, as is the general rule.

Box 1.2.A Measures included in the reform to complete the Toledo Pact recommendations.

The Toledo Pact (*Pacto de Toledo*, by its Spanish name) is an agreement first reached in 1995 by the main political parties in Spain. The aim of this pact is to build a broad political consensus on the design and management of the Spanish pension system and to guarantee its performance according to a set of principles, including its financial sustainability. This agreement is periodically assessed and updated by a standing committee of the Spanish Parliament ('the committee').

On October 27th, 2020, the committee approved an updated text of the agreement. The revision was passed with 30 votes out of 37. On November 19th, 2020, the new agreement was endorsed by the Spanish Parliament with the support of political parties representing 75% of the seats. Traditionally, the endorsement by the Spanish Parliament of an update of the Toledo Pact has been the first step towards enacting a reform of the Spanish pension system. Likewise, the updated text has usually

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[19] Gaps in men's contribution profile receiving the gender gap complement will be filled in the same manner.

become the blueprint that guides the reform. This was the case with the pension reform of 2011 and it has also been the case with the latest pension reform.

The latest update of the Toledo Pact included, among others, the following recommendations:

- **Clarify and separate the system's financial sources according to their nature.** The committee underlined that social contributions must exclusively finance contributory benefits and pointed out several expenditure categories whose funding should be transferred to the Budget of the Central Government. Measures in this direction have already been taken in the 2021, 2022 and 2023 budgets.

- **Guarantee the purchasing power of pensions.** The committee acknowledged the IRP's lack of social and political support and recommended linking pension indexation to CPI by law, as had been the case until 2014. In December 2021 a new indexation rule based on CPI was incorporated by law 21/2021.

- **Reduce the gap between statutory and effective retirement ages.** The committee advocated for mechanisms to encourage the extension of working life beyond the statutory retirement age, supported partial retirement schemes compatible with salaried and professional activities, demanded active labor policies to re-skill older workers and to limit the use of early retirement, which should only be used in special circumstances. In December 2021, the new bonus/malus scheme for late/early retirement was established by law 21/2021.

- **Strengthen employment pension plans (second pillar) and individual pension plans (third pillar)** as complementary tools of public pensions. In June 2022, by law 12/2022, a new and more stable frame for occupational schemes was established, a new fund of public promotion but with private management was created, the population covered by occupational schemes extended and the bureaucracy involved in these plans simplified.

- **Finalize the process of simplification of special schemes.** The committee set as a goal a simplification of the public pension system where only two schemes are available: the general system and the special system for the self-employed. RDL 13/2022 establishes a new system by which the self-employed contribute according to their real earnings. It also strengthens their protection when ceasing activity.

- **Gender gap reduction.** The committee established that it is necessary to guarantee an effective equality between men and women in the working environment. To reduce the difference due to gender RDL 3/2021 replaces the maternity complement (*complemento por maternidad*) by the gender gap complement (*complemento para la reducción de la brecha de género*) which relaxes the eligibility criteria by making more women eligible (mothers with one child are eligible instead of two according to the previous criteria) and which also enables men under certain circumstances to be eligible (when their careers were interrupted because of paternity, among others). RDL 2/2023 establishes higher figures to fill in contribution gaps for all women or men that are eligible to receive the gender gap complement.

- **Adequacy of contributory bases and contribution period**. RDL 2/2023 extends the contributory period from 300 months to the best 324 months of the last 348. Maximum contributory bases are to increase as established in the RDL to ensure the sustainability of the system. Maximum pensions will evolve under new explicit rules.

- **Adequacy**. The Toledo Pact agrees that pensions must guarantee a dignified living standard of beneficiaries. In this regard RDL2/2023 links minimum pension benefits to an established poverty threshold to ensure the adequacy of the pension system. It also addresses that contributions must be sufficient and supportive by including a solidarity levy on the extra

> income over the maximum contributory base and an additional contribution for employers and employees as an intergenerational equity mechanism (MEI).

1.3. Description of the actual 'constant policy' assumptions used in the projection

The pension expenditure projections are based on a model underpinned by a set of demographic, macroeconomic and institutional assumptions. The European Commission services provided the Spanish delegation with the common demographic and macroeconomic assumptions that are discussed in Section 2 of this fiche.

The constant policy assumptions used in the model are as follows:

- Contributory bases are projected assuming that they increase in line with nominal wages. The cap and floor of the contributory bases are assumed to increase at the same rate as pre-existing pension benefits. Besides, from 2024 to 2050 the growth rate of the cap on the contributory bases includes 1.2 additional percentage points, in line with current Spanish legislation.

- Pensionable income ("*base reguladora*") is calculated from 2044onwards as the sum of the best 324 contribution bases over the last 348 prior to retirement. Until that year, a gradual transition to this rule is applied in accordance with the current law. Contributory bases used to calculate pensionable income are valorised using CPI except for the last 24 months before the retirement date for which observed nominal values are used. Besides, gaps in the contribution period are filled following the specificities of the current law.

- The cap on the initial pension (i.e. the value of the maximum pension benefit) is assumed to increase at the same rate as pre-existing pension benefits. From 2025 to 2050 0.115 percentage points are added each year to the previous rule. From 2051 to 2065 an accumulated growth rate of 20% in real terms is applied.

- The floor on the initial pension (i.e. the minimum pension benefit) increases at the same rate as pre-existing pensions up to 2057 and with nominal wage growth thereafter. This takes into account that minimum pensions' ultimate goal is to guarantee a minimum standard of living for pensioners. Therefore, minimum pension benefits are indexed to the same rate as pre-existing pensions benefits to the moment where the minimum pension benefit is close to the guaranteed income, which tracks nominal wage growth. From that point on, the minimum pension benefit is indexed to nominal wage growth. Besides, from 2024 to 2027 higher growth rates are applied to the minimum pension benefit to close the existing gap with respect to the poverty line in accordance with the current law.

- Non-earnings-related pension benefits are indexed to nominal wage growth, in accordance with the commonly-agreed AWG methodology. Besides, from 2024 to 2027 higher growth rates are applied to close the existing gap with respect to the poverty line in accordance with the current law.

- Once new pension benefits have been calculated and included in the stock of pre-existing pensions, they are indexed annually using the CPI[20].

- When projecting private pension schemes, a 4% nominal interest rate is assumed throughout the projection horizon, in keeping with the common AWG assumptions.

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[20] A 3.6% revaluation rate is applied in 2024, since it is the projected rate at the time of the elaboration of this fiche.

2. Overview of the demographic and labour force projections[21]

The demographic dynamics are a crucial element of the projection exercise. The size and age composition of the Spanish population are a key driver of pension expenditure in the future. Moreover, the size of the labour force is one of the factors behind long-term nominal GDP growth and influences the relative magnitude of pension expenditure as a percentage of GDP. This section analyses the main projected features of the Spanish population and labour force throughout the projection horizon.

2.1. Demographic projections

The Spanish population in 2070 is projected to be very similar in size to the one in 2022. The projected population in 2070 is 47.69 million, compared to 47.71 million in 2022. This relative aggregate stability in volume hides two different growth trends (see Table 6 below). From 2022 to 2046 the Spanish population is projected to grow, peaking in 2046 at 50.55 million. From there onwards, the population projection follows a downward trend.

TABLE 6 – MAIN DEMOGRAPHIC VARIABLES

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Population (thousand)	47,707	49,315	50,277	50,429	49,216	47,690	50,548	2046	-17
Population growth rate	0.6%	0.2%	0.2%	-0.1%	-0.3%	-0.3%	1.0%	2023	-0.9%
Old-age dependency ratio (pop 65+ / pop 20-64)	33.3	39.9	52.6	63.9	64.0	64.5	64.5	2054	31.2
Old-age dependency ratio (pop 75+ / pop 20-74)	14.1	15.9	21.4	29.1	33.8	32.0	33.8	2059	17.8
Ageing of the aged (pop 80+ / pop 65+)	30.0	29.9	31.3	37.4	46.3	45.0	47.2	2063	14.9
Men - Life expectancy at birth	80.8	82.1	83.5	84.8	86.0	87.1	87.1	2070	6.3
Women - Life expectancy at birth	86.5	87.5	88.6	89.7	90.6	91.5	91.5	2070	5.0
Men - Life expectancy at 67	17.9	18.9	19.8	20.7	21.6	22.4	22.4	2070	4.5
Women - Life expectancy at 67	21.8	22.7	23.5	24.3	25.1	25.8	25.8	2070	4.0
Men - Survivor rate at 65+	88.6	89.9	91.4	92.6	93.7	94.6	94.6	2070	6.0
Women - Survivor rate at 65+	94.4	95.1	95.7	96.3	96.7	97.2	97.2	2070	2.7
Men - Survivor rate at 80+	61.7	66.0	70.3	74.1	77.5	80.5	80.5	2070	18.8
Women - Survivor rate at 80+	79.9	82.5	84.8	86.9	88.6	90.2	90.2	2070	10.2
Net migration (thousand)	677.2	221.2	231.7	196.2	185.9	193.7	677.2	2022	-483.5
Net migration (% population previous year)	1.4%	0.4%	0.5%	0.4%	0.4%	0.4%	1.4%	2022	-1.0%

Source: Eurostat, European Commission.

Fertility and mortality projections result in negative natural growth for the whole projection horizon. Fertility rates are projected to increase at a moderate pace from a level close to 1.2 children per women in 2022 to around 1.4 in 2070 (Figure 3). Mortality rates fall during the projection horizon, resulting in a higher life expectancy at birth. Life expectancy at 67 – a relevant metric in the Spanish case given that the general statutory retirement age is set to be 67 from 2027 onwards – is expected to grow almost 5 years (from 17.9 to 22.4 years for men and from 21.8 to 25.8 for women) between 2022 and 2070. The combination of relatively low fertility rates and an ageing population (that results in an increasing number of deaths despite the gains in life expectancy) leads to a negative natural growth of the population for the entire projection period and this trend is projected to accelerate between 2030 and 2050.

The only source of population growth in the projection is net migration. Net migration starts at a high level of over 677,200 net migrants per year in 2022, influenced by the significant arrival of Ukrainian refugees, though it drops sharply and stabilizes later at around 220,000 net migrants per year from 2030 to 2050 and around 190,000 net migrants per year from 2050 to 2070. This migratory dynamic, coupled with a negative natural growth, implies that the composition of the Spanish population by country of origin is projected to change significantly in the coming decades.

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[21] For more details, see European Commission and EPC (2023), '*2024 Ageing Report: Underlying assumptions and projection methodologies*', European Economy, Institutional Paper 257.

The old-age dependency ratio is set to increase very significantly due to the ageing of the Spanish population (Table 6). At the beginning of the projection the old-age dependency ratio (measured as the ratio of population aged over 64 and population aged 20-64) is close to 33. In the projection, this ratio grows quickly and almost doubles in three decades, peaking at 64.5 by 2054 and stabilises around 64 for the rest of the projection horizon. This is the most significant development in the demographic scenario for the dynamics of pension expenditure, as it is shown at length below.

FIGURE 2 – AGE STRUCTURE: 2022 VS 2070
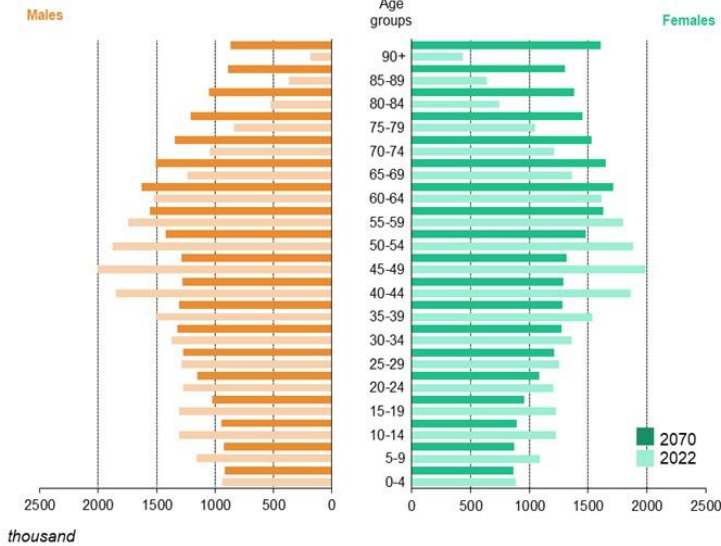
Source: Eurostat, European Commission.

The demographic projections for the 2024 edition of the Ageing Report differ from the 2021 edition in several ways. On the one hand, fertility rates are slightly lower in this exercise (0.1 less on average, as shown in Figure 3). On the other hand, net migration is higher throughout the projection horizon in the AR 2024 (Figure 4), specially from 2022 to 2026 (210 thousand people more on average). In total AR24 net migration adds 2.3 million people more in 2070 than in the AR21 projections. These differences result in an old-age dependency ratio that is slightly lower in the AR24 until 2062 (Figure 5). However, the difference is maximum 1% and the pattern is quite similar in both projections. Finally, life expectancy at birth (Figure 6) is slightly lower in the first years of the projection because of the impact of the COVID-19 pandemic on mortality, although it converges later to the same values as in the AR21.

FIGURE 3 – PROJECTED FERTILITY RATE (NUMBER OF CHILDREN) IN THE 2021 AGEING REPORT AND THE 2024 AGEING REPORT
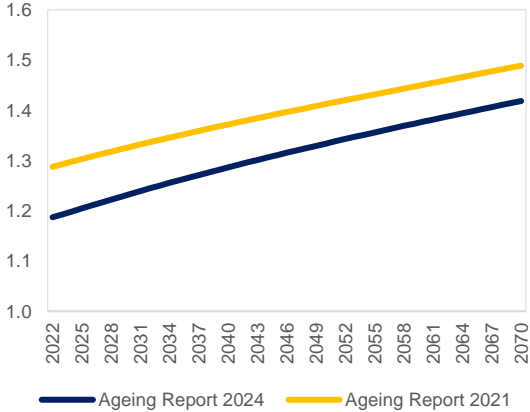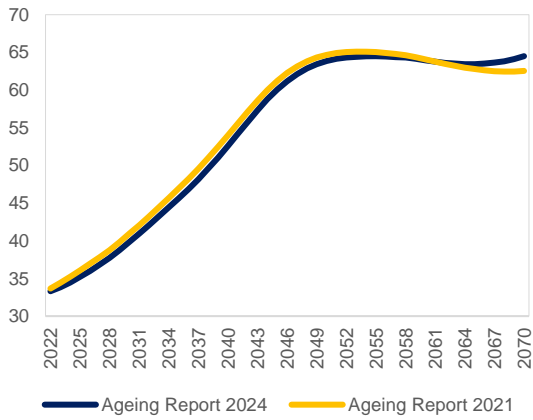
FIGURE 4 – NET MIGRATION (NUMBER OF MIGRANTS) IN THE 2021 AGEING REPORT AND THE 2024 AGEING REPORT
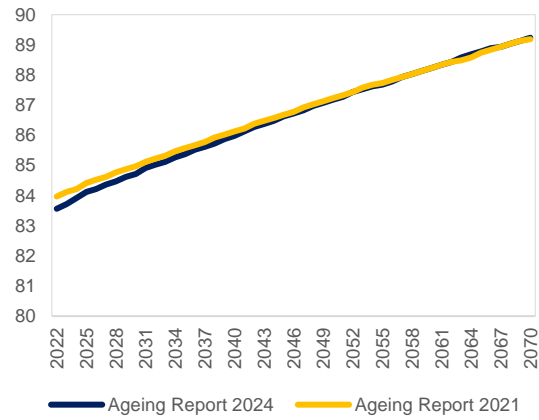
Source: Eurostat and Spanish General Directorate for Macroeconomic Analysis

2.2. Labour force projections

The labour force is calculated by the European Commission's services on the basis of the demographic projections described in the section above and the macroeconomic scenario. Participation and employment rates projections take into account the 2011 pension reforms that gradually increase the general statutory retirement age from 65 to 67 years by 2027. They also include the effects of the measures adopted in 2021 aimed at increasing the effective retirement age, such as the revised bonus/malus scheme. As Table 7 shows, the participation rate 20-64 is expected to increase by 2 pp trough the projection interval, with greater gains in terms of employment rates (almost 7 pp) and the share of employed population (6 pp). These positive developments are more salient for older workers aged 55-64 and 65-74 as a result of the aforementioned reforms.

TABLE 7 – PARTICIPATION RATE, EMPLOYMENT RATE AND SHARE OF WORKERS

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Labour force participation rate 20-64	79.6	80.6	81.9	82.2	81.9	81.6	82.3	2047	2.0
Employment rate of workers aged 20-64	69.6	72.0	74.5	76.8	76.6	76.4	76.9	2052	6.8
Share of workers aged 20-64 in the labour force 20-64	87.4	89.3	90.9	93.4	93.6	93.6	93.6	2059	6.2
Labour force participation rate 20-74	69.1	69.2	69.0	68.8	70.5	69.6	70.5	2060	0.5
Employment rate of workers aged 20-74	60.4	62.0	63.0	64.4	66.0	65.2	66.0	2060	4.8
Share of workers aged 20-74 in the labour force 20-74	87.5	89.5	91.2	93.6	93.8	93.8	93.8	2070	6.3
Labour force participation rate 55-64	65.4	72.9	77.8	77.4	77.9	77.5	77.9	2061	12.1
Employment rate of workers aged 55-64	57.6	65.8	71.2	72.5	73.3	72.9	73.3	2062	15.2
Share of workers aged 55-64 in the labour force 55-64	88.2	90.2	91.6	93.8	94.0	94.0	94.0	2067	5.9
Labour force participation rate 65-74	6.4	13.8	18.9	18.8	19.6	20.5	20.5	2070	14.1
Employment rate of workers aged 65-74	6.0	13.1	18.1	18.2	19.1	19.9	19.9	2070	13.9
Share of workers aged 65-74 in the labour force 65-74	93.9	95.1	95.9	97.0	97.1	97.1	97.1	2068	3.2
Median age of the labour force	43.0	44.0	43.0	43.0	44.0	44.0	45.0	2061	1.0

Source: European Commission.

The effects of the 2011 and 2021 reforms can also be seen in the evolution of the average labour market exit age. From 2022 to 2070 the average labour market exit age is expected to grow 2.5 years for men and 2.3 years for women. This development progressively translates into the average contributory period as well, that is expected to grow 2.6 years for men and 7.8 years for women. Another important effect of these reforms is that the percentage of adult life spent in retirement remains roughly stable despite gains in life expectancy. Moreover, the early-to-late exit ratio declines substantially in the projection horizon.

TABLE 8 – LABOUR MARKET EXIT BEHAVIOUR

TOTAL	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	63.4	64.3	65.4	66.2	65.7	65.7	66.2	2049	2.3
Average labour market exit age (CSM)**	64.0	65.6	66.4	66.4	66.4	66.4	66.4	2040	2.4
Contributory period	37.8	38.4	39.4	40.4	41.5	42.6	43.0	2070	5.2
Duration of retirement***	22.4	21.7	22.6	23.4	24.2	25.0	25.0	2070	2.6
Duration of retirement/contributory period	59%	56%	57%	58%	58%	58%	60%	2024	-1%
Percentage of adult life spent in retirement****	34%	32%	33%	34%	34%	35%	35%	2070	1%
Early/late exit*****	3.8	2.4	1.5	1.0	1.2	1.0	6.7	2024	-2.8

MEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	63.2								
Average labour market exit age (CSM)**	64.0	65.6	66.4	66.4	66.4	66.4	66.4	2040	2.5
Contributory period	40.5	40.9	41.4	42.0	42.5	43.0	43.0	2070	2.6
Duration of retirement***	20.3	19.7	20.7	21.6	22.4	23.3	23.3	2070	3.0
Duration of retirement/contributory period	50%	48%	50%	51%	53%	54%	54%	2070	4%
Percentage of adult life spent in retirement****	32%	30%	31%	32%	33%	33%	33%	2070	2%
Early/late exit*****	3.9	2.5	1.4	0.9	1.2	1.0	7.0	2024	-3.0

WOMEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	63.8								
Average labour market exit age (CSM)**	64.0	65.6	66.4	66.4	66.4	66.4	66.4	2040	2.3
Contributory period	34.3	35.6	37.3	38.9	40.5	42.1	42.1	2070	7.8
Duration of retirement***	24.5	23.6	24.4	25.2	26.0	26.7	26.7	2069	2.2
Duration of retirement/contributory period	71%	66%	65%	64%	63%	62%	72%	2024	-9%
Percentage of adult life spent in retirement****	36%	34%	34%	35%	36%	37%	37%	2069	1%
Early/late exit*****	3.6	2.4	1.6	1.0	1.2	1.0	6.4	2024	-2.5

*The 'average effective retirement age' is the age at which people start receiving a pension benefit (old-age, early or disability). It is calculated on the basis of the administrative data on new pensioners for 2022, showing projected data for the other years for the total. ** 'Average labour market exit age (Cohort Simulation Model)' refers to 2023 instead of 2022. *** 'Duration of retirement' is the remaining life expectancy at the average labour market exit age. **** The 'percentage of adult life spent in retirement' is calculated as the ratio between the duration of retirement and the life expectancy minus 20 years. ***** 'Early/late exit' is the ratio between those who exit the labour market before reaching the statutory retirement age and those who exit at or beyond the statutory retirement age. For 2022, the value refers to 2023.*

Source: European Commission.

Box 2.2.A The impact of the measures aimed at reducing the gap between the effective and the statutory retirement age.

Law 21/2021 incorporates several measures aimed at increasing the effective retirement age and at reducing the gap with respect to the statutory retirement age. High among those is the new malus scheme, which is more penalizing and better targeted, as well as a more generous bonus scheme (see section 1.2). These measures affect the public pension expenditure projections in various ways. To analyse and quantify this impact, a comparative exercise with respect to the 2021 Ageing Report is carried out in this box. The previous Ageing Report did not include the effects of the measures adopted in December 2021 and can be used as a counterfactual scenario.

First, these measures incentivize that new retirements take place on average at a higher age, which yields a lower number of pensioners as well as shorter average spells in retirement. This can be seen in the evolution of the average labour market exit age[22] (Figure 7). Two stages can be identified in this process. Up to 2027 the gradual extension of the general statutory retirement age takes place. This measure is included in both the 2021 Ageing Report and the 2024 Ageing Report. Nonetheless, in the 2024 Ageing Report the new bonus/malus scheme also affects the evolution of the average labour market exit age during these years. Therefore, even though the starting point in the 2024 Ageing Report is lower than the value for 2023 in the 2021 Ageing Report (64 years in the AR24, 64.8 in the AR21)

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[22] The average labour market exit age is calculated by the European Commission based on the Labour Force Survey data for the base year and estimated by the Cohort Simulation Model thereafter. For more details, see European Commission and EPC (2023), '*2024 Ageing Report: Underlying assumptions and projection methodologies*', European Economy, Institutional Paper 257, annexes 1 and 2.

it increases faster and reaches the same level as in the 2021 Ageing Report in 2027. As of 2027 the upward trend shown by the average labour market exit age in the 2024 Ageing Report is caused by the complete deployment of the measures adopted in December 2021. Since these measures were not incorporated in the 2021 Ageing Report, the average labour market exit age in the AR21 stabilised around the same level as in 2027. All in all, in the 2024 Ageing Report the average labour market exit age stabilizes in the long run around 66.4 years, in contrast to the 2021 Ageing Report in which the average exit age in 2070 was 65.8. Besides, the accumulative increase of the average labour market exit age with respect to 2023 is near 2.5 years in the 2024 Ageing Report, whereas in the 2021 Ageing Report it was around 1 year (Figure 8).

FIGURE 7 – AVERAGE LABOUR MARKET EXIT AGE
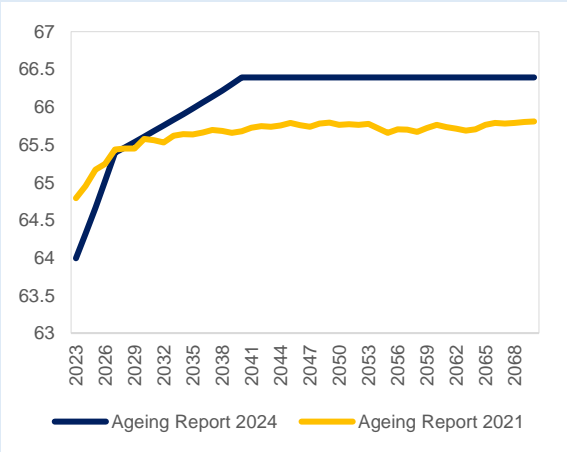
FIGURE 8 – DIFFERENCE OF THE AVERAGE LABOUR MARKET EXIT AGE WITH RESPECT TO 2023
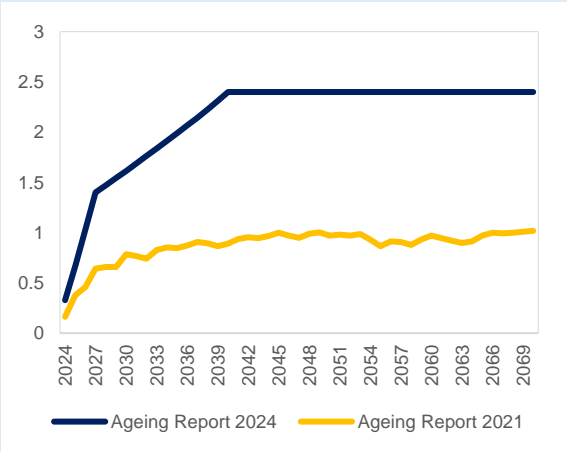
Source: European Commission and Spanish General Directorate for Macroeconomic Analysis

Second, since new retirements take place at older ages, workers tend to actively participate in the labour market for longer. In other words, the average contributory period increases as people keep working until older ages. As a result, participation rates of the oldest cohorts increase. As shown in Figure 9, the participation rate 67-74 in the 2024 Ageing Report is higher than in the 2021 Ageing Report. Furthermore, the gap between both series increases considerably during the projection period as the adopted measures take full effect. In 2070, the participation rate 67-74 in the 2024 Ageing Report is 13.6%, almost 3 pp higher than in the 2021 Ageing Report (10.9% in 2070).

FIGURE 9 – PARTICIPATION RATE 67-74 YEARS
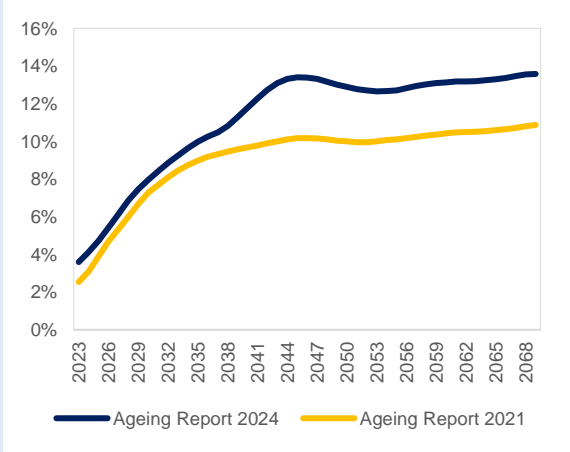
Source: European Commission and Spanish General Directorate for Macroeconomic Analysis

Finally, the shift on the workers' behaviour caused by the adopted measures also affects the average new pension benefit through three main channels. First, part of the new retirees will postpone their retirement to avoid higher penalties or to benefit from a higher bonus. This entails longer contribution profiles and therefore higher accrual rates and pension benefits. Second, due to the postponement in retirement there will be fewer early retirements and more late retirements (extensive margin). At the same time, those still retiring early will do it at an older age, and those already retiring after the legal age will do it at an even older age (intensive margin). This will inevitably translate into higher new pension benefits. Third, new penalties and bonuses directly reduce or increase new old-age pension benefits. All in all, it is estimated[23] that the measures adopted in December 2021 aimed at increasing the effective retirement age will lead to a 2.5% higher new old-age average pension benefit once the reform comes fully into force.

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[23] See chapter 4.3 for further details on the program used to obtain this estimate.

3. Pension projection results

3.1. Coverage of the pension projections

The projections offer full coverage of the Spanish pension system. More precisely, the projection covers the three components of the public system (Social Security, *Clases Pasivas* and non-earning related pensions) as well as private pension schemes. The Social Security system comprises several special schemes covering the self-employed, domestic workers, miners, seamen and artists. These special schemes are included in the model as part of the Social Security figures although they are not modelled separately for three main reasons. First, the very small size of the miners and seamen schemes means that the extra complexity of modelling them separately would not add much value to the model. Second, given their small size, there are important problems hindering access to the microdata. Third, in the case of domestic workers and the self-employed, the rules that give access to a pension and the calculation rules of the benefits are very similar to the general Social Security regime.

The three types of pensions are covered both for the Social Security system and *Clases Pasivas*:

- Retirement and early retirement pensions represent 74% of total public pension expenditure in 2022 and 64% of total public pensions in the same year.

- Disability pensions represent 8% of total public pension expenditure and 9% of total public pensions in 2022.

- Survivors' pensions, comprising widow(er)s, orphans and survivors' pensions other than spouses and children ('*favor de familiares*' by its Spanish denomination) represent 18% of total public expenditure and 27% of pensions in 2022.

Table 9 compares the actual expenditure in public pensions observed by Eurostat with the definition of the Ageing Working Group. The difference between series has become minimal and is caused partially by rounding discrepancies.

TABLE 9 – ESSPROS AND AWG DEFINITION OF PENSION EXPENDITURE (%GDP)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	change 2013-2021
Eurostat total pension expenditure	12.6	12.8	12.6	12.6	12.4	12.6	12.7	14.5	14.1	1.5
Eurostat public pension expenditure (A)	12.2	12.4	12.2	12.2	12.0	12.2	12.4	14.2	:	2.0
Public pension expenditure (AWG: outcome) (B)	12.1	12.2	12.2	12.1	12.0	12.2	12.3	14.1	13.5	1.4
Difference Eurostat/AWG: (A)-(B)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	:	0.0

Source: Eurostat, European Commission.

Private pension data coverage remains the same as in the 2021 Ageing Report, thus showing information on non-mandatory individual and occupational schemes. The collective schemes category comprises two financial products: occupational pension plans ('*planes de pensiones*') and collective pension insurance plans ('*seguros colectivos*'). The individual schemes category includes individual pension plans ('*planes individuales*') and individual insurance plans ('*planes de prevision asegurados*').

3.2. Overview of projection results

This subsection describes the main trends in pension expenditure projected for the period 2022-2070. Pension expenditure is disaggregated by i) pension regime, ii) type of pension, iii) age group and iv) public/private pension schemes.

The series of expenditure as a share of GDP shows an upward trend until 2050 due to the progressive retirement of large cohorts of workers (the Spanish baby boom generation) and the increase in the old-age dependency ratio. Once the demographic pressure eases in the 2050s, public pension expenditure slightly falls and stabilizes around 17% of GDP. Although the demographic pressures almost completely disappear at the end of the projection period, the share of public pension expenditure to GDP does not decline in the same magnitude due to higher average pension benefits as well as a higher rate of pensioners receiving the maximum pension (see box 3.5.A).

TABLE 10 – PROJECTED GROSS AND NET PENSION SPENDING AND CONTRIBUTIONS (%GDP)

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Expenditure									
Gross public pension expenditure	**13.1**	**14.3**	**16.2**	**17.3**	**16.9**	**16.7**	**17.3**	**2051**	**3.6**
Private occupational pensions	0.2	0.2	0.3	0.2	0.1	0.1	0.3	2039	-0.1
Private individual mandatory pensions	:	:	:	:	:	:	:	:	:
Private individual non-mandatory pensions	0.1	0.3	0.3	0.2	0.1	0.1	0.3	2028	0.0
Gross total pension expenditure	13.4	14.9	16.7	17.6	17.1	16.9	17.6	2050	3.5
Net public pension expenditure*	12.0	13.1	14.8	15.8	15.4	15.3	15.8	2051	3.3
Net total pension expenditure*	12.3	13.6	15.3	16.1	15.7	15.5	16.1	2050	3.2
Contributions									
Public pension contributions	12.9	13.8	14.3	14.6	14.0	14.0	14.6	2050	1.1
Total pension contributions	13.3	14.2	14.6	14.8	14.2	14.1	14.8	2050	0.8
Balance of the public pension system (%GDP)**	-0.2%	-0.5%	-1.9%	-2.7%	-2.8%	-2.7%	-3.1%	2053	-2.6%

Net pension expenditure excludes taxes on pensions and compulsory social security contributions paid by beneficiaries. **Public pension contributions - gross public pension expenditure (peak value/year shows most negative value).

Source: European Commission, EPC.

By regime (see Figure 10), the general regime of the Social Security system represents the lion's share of aggregate expenditure, and it determines the overall dynamics of expenditure. *Clases Pasivas* was closed to new entrants on January 1st, 2011. Therefore, this regime is set to fade away progressively and eventually disappear. The projections show that by 2070 this process would be almost completed. Finally, non-earnings-related public pensions represent a minor share of overall expenditure on public pensions and are projected to remain this way.

FIGURE 10 – TOTAL PUBLIC PENSION EXPENDITURE BREAKDOWN BY PENSION SCHEME
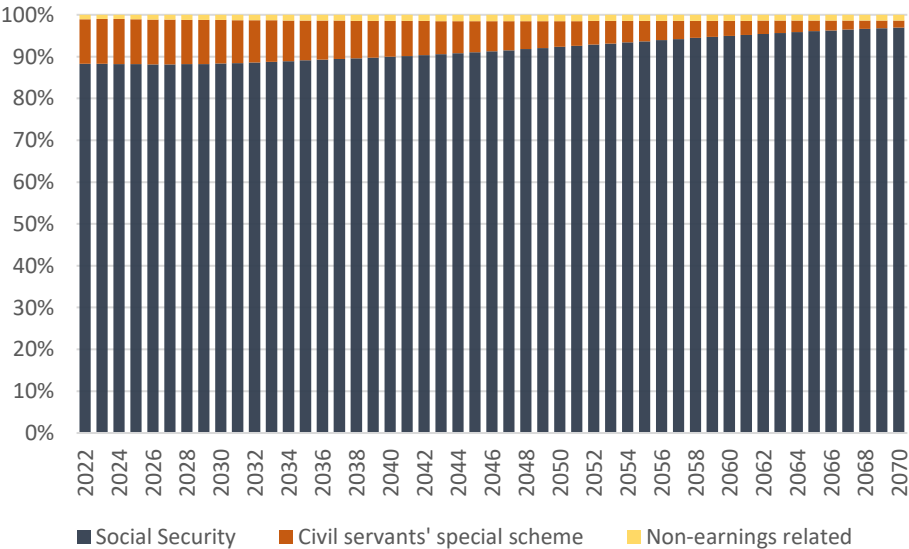
Source: Spanish General Directorate for Macroeconomic Analysis

By pension type, old-age pensions represent the bulk of total expenditure on public pensions and the main driver behind its dynamics. The second most important pension type in Spain are survivors' pensions ('*favor de familiares*', orphans and, especially, widow(er)s). Expenditure projections in this

category are based on general mortality and marriage rates, average age differences between spouses and the size of the population. On the one hand, lower mortality rates imply that new pensions are granted later (and thus, on this account, they reduce the average duration). On the other hand, higher life expectancy implies that pensioners will benefit from the pension for longer. The size of the population and indexation rules are the other two drivers that help to explain the evolution of survivors' pensions. Disability pensions represent a minor share of total expenditure and are modelled as a proportion of the labour force. This proportion is a weighted average of the observed probabilities of suffering a disability across ages in the baseline year and remains constant throughout the projection (see methodological annex).

TABLE 11 – GROSS PUBLIC PENSION SPENDING BY SCHEME (%GDP)

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Total public pensions	**13.1**	**14.3**	**16.2**	**17.3**	**16.9**	**16.7**	**17.3**	**2051**	**3.6**
Old-age and early pensions	9.7	11.0	13.0	14.3	13.9	13.8	14.4	2051	4.1
Flat component	:	:	:	:	:	:	:	:	:
Earnings-related	9.6	10.8	12.8	14.1	13.7	13.6	14.1	2052	4.0
Minimum pensions (non-contributory)	0.1	0.2	0.3	0.3	0.2	0.2	0.3	2047	0.1
Disability pensions	1.1	1.0	0.9	0.8	0.9	0.9	1.1	2023	-0.2
Survivor pensions	2.3	2.3	2.3	2.2	2.1	2.0	2.4	2023	-0.3
Other pensions	:	:	:	:	:	:	:	:	:

	2022	2030	2040	2050	2060	2070	Peak value	Peak year	change 2022-2070
Special pension schemes									
Total	1.7	1.8	1.7	1.4	1.0	0.6	1.8	2033	-1.0
- Difficult conditions	0.3	0.3	0.3	0.4	0.4	0.4	0.4	2055	0.1
- Security and dfence	0.3	0.3	0.3	0.2	0.1	0.1	0.3	2030	-0.2
- Others	1.1	1.2	1.1	0.8	0.5	0.2	1.2	2030	-0.9

Source: European Commission, EPC.

FIGURE 11 – TOTAL PUBLIC PENSION EXPENDITURE BREAKDOWN BY PENSION TYPE
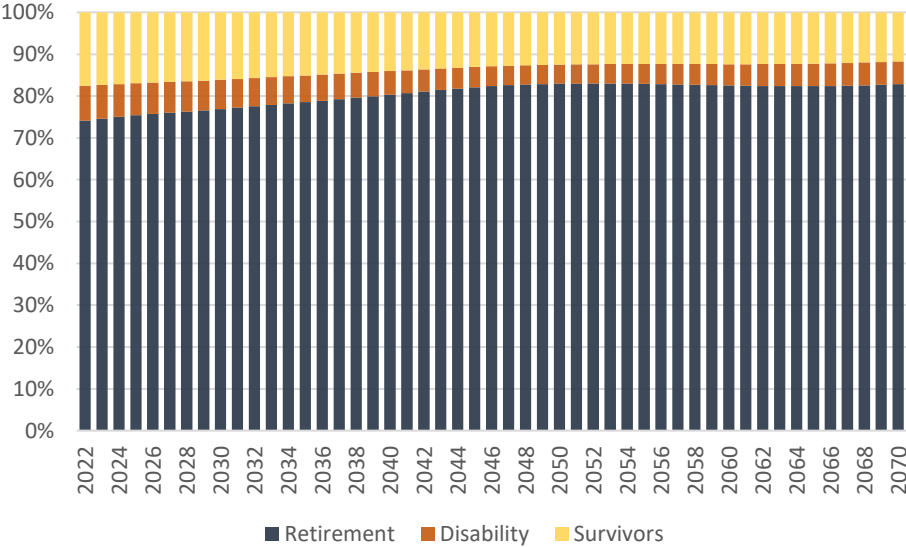
Source: Spanish General Directorate for Macroeconomic Analysis

The breakdown by age groups is consistent with the projected dynamics of the labour market and age structure of the Spanish population (i.e., its ageing process) and the full unfolding of the reforms of the system enacted in 2011 and 2021. The share of the age group below 65 is set to decrease over the projection horizon, reflecting the progressive increase in the effective retirement age encouraged by the measures adopted in 2021. On the other end of the age distribution, the share of pension expenditure on those aged above 75 is projected to increase steadily, reflecting gains in life expectancy and the ageing of the population. For age groups in between, their respective share is projected to increase when the

Spanish baby boom cohorts are in this age bracket and to decrease afterwards, reflecting the relative cohort size of the Spanish population pyramid.

Legend: ■ 75+ ■ 70-74 ■ 65-69 ■ 60-64 ■ 55-59 ■ <55
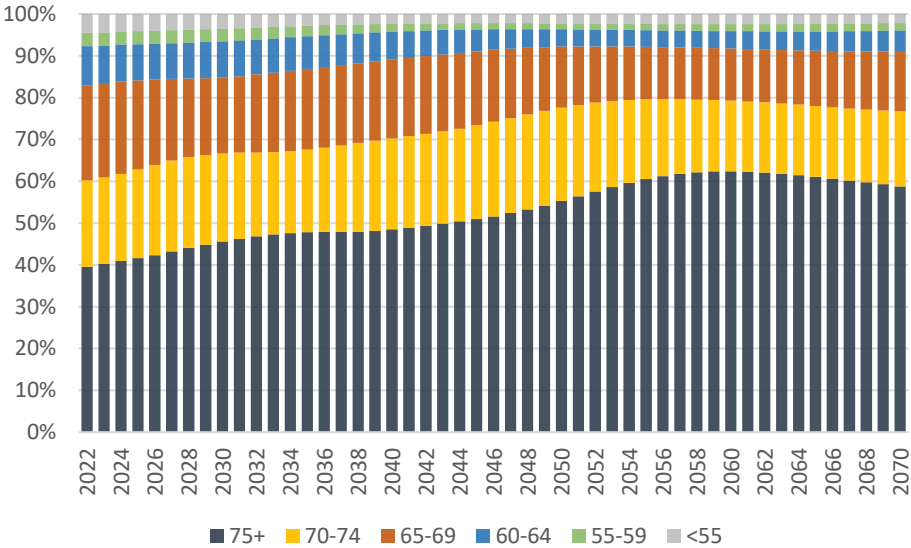
Source: Spanish General Directorate for Macroeconomic Analysis

Projected expenditure on private pension schemes as a share of GDP remains flat until 2040 and then starts decreasing during the rest of the projection horizon (Table 10). This fall is mainly due to the decrease in private non-mandatory schemes expenditure as a result of new thresholds for contributions that will apply to these types of private schemes. More precisely, the threshold has been lowered from 8.000 euros a year to 1.500 euros with the possibility to reach an extra 8.500 euros only if those extra contributions are employer's contributions. The aim of this new measure is to incentivize occupational schemes.

3.3. Description of main driving forces behind the projection results and their implications

This subsection further analyses the projections, focusing on several key aspects of the system. First, the evolution of the pension expenditure-to-GDP ratio is disaggregated into multiple components. Then, two of these components (the benefit ratio and the dependency ratio) are examined separately as they drive some of the most important dynamics of the projections. Finally, new pension expenditure is also disaggregated.

3.3.1. Public pension expenditure breakdown

The share of public pension expenditure on GDP can be disaggregated into four components (see Figure 13). The dependency ratio captures the dynamics of the age structure of the population. The coverage ratio indicates how broadly the public pension benefits are distributed among the population. The benefit ratio relates the average pension in the system to the average wage in the economy. Finally, the labour market effect shows how the effort to fund the system is distributed across the labour force.

FIGURE 13 – DISAGGREGATION OF PUBLIC PENSION EXPENDITURE

$$\underbrace{\frac{pension\ expenditure}{GDP}}_{} = \underbrace{\frac{population\ 65+}{population\ 20-64}}_{dependency\ ratio} \times \underbrace{\frac{number\ of\ pensioners}{population\ 65+}}_{coverage\ ratio} \times \underbrace{\frac{average\ pension\ income}{\frac{GDP}{hours\ worked\ 20-74}}}_{benefit\ ratio} \times \underbrace{\frac{population\ 20-64}{hours\ worked\ 20-74}}_{labour\ market\ effect} \quad [1]$$

$$\frac{number\ of\ pensioners}{population\ 65+} = \underbrace{\frac{number\ of\ pensioners\ 65+}{population\ 65+}}_{coverage\ ratio\ old\text{-}age} + \left(\underbrace{\frac{number\ of\ pensioners\ \leq65}{population\ 50-64}}_{coverage\ ratio\ early\text{-}age} \times \underbrace{\frac{population\ 50-64}{population\ 65+}}_{cohort\ effect} \right) \quad [2]$$

$$\frac{population\ 20-64}{hours\ worked\ 20-74} = \underbrace{\frac{population\ 20-64}{employed\ people\ 20-64}}_{1/employment\ rate} \times \underbrace{\frac{employed\ people\ 20-64}{hours\ worked\ by\ people\ 20-64}}_{1/labour\ intensity} \times \underbrace{\frac{hours\ worked\ by\ people\ 20-64}{hours\ worked\ by\ people\ 20-74}}_{1/career\ shift} \quad [3]$$

Source: European Commission, EPC.

Public pension expenditure is projected to increase 3.6 pp from 2022 to 2070. The bulk of this dynamic is explained by the old-age dependency ratio evolution, which rises significantly between 2022 and 2070 (10.3 pp), reflecting the ageing of the Spanish population incorporated in the demographic projections used in this report (see section 2.1). On the other hand, two main factors help to moderate the increase of public pension expenditure. First, the decline of the benefit ratio (-4.1 pp) due to a higher growth rate of wages than pension benefits. Also, the increasing share of capped new old-age retirement pensions, due to higher growth rates of contribution bases than of the maximum pension amount, plays an important role in the decline of the benefit ratio. Second, the labour market effect also mitigates the increase of the pension expenditure ratio, because of a higher employment ratio and a career shift effect, both encouraged by the measures adopted in the 2011 and 2021 reforms.

TABLE 12 – FACTORS BEHIND THE CHANGE IN PUBLIC PENSION EXPENDITURE BETWEEN 2022 AND 2070 (PPS OF GDP) – PENSIONS[24]

	2022-30	2030-40	2040-50	2050-60	2060-70	2022-70
Public pensions to GDP	1.2	1.9	1.1	-0.4	-0.2	3.6
Dependency ratio effect	2.4	4.4	3.4	0.0	0.1	10.3
Coverage ratio effect*	-1.0	-0.6	0.4	0.8	0.0	-0.4
Coverage ratio old-age	-0.9	0.2	1.1	0.8	-0.1	1.1
Coverage ratio early-age	-0.5	0.2	-0.7	-0.8	0.3	-1.4
Cohort effect	-1.2	-4.7	-4.0	1.6	0.2	-8.1
Benefit ratio effect	0.2	-0.9	-1.9	-1.4	-0.2	-4.1
Labour market effect	-0.7	-0.8	-0.5	0.2	-0.1	-1.9
Employment ratio effect	-0.4	-0.5	-0.5	0.0	0.1	-1.3
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0
Career shift effect	-0.3	-0.4	0.0	0.1	-0.1	-0.6
Residual	0.3	-0.3	-0.2	0.0	0.0	-0.2

* Subcomponents of the coverage ratio effect do not add up necessarily.

Source: European Commission, EPC.

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[24] For the disaggregation based on the number of *pensioners*, see Table A3 in the methodological annex.

A closer look at the overall change in the pension expenditure ratio shows two periods with different trends and component dynamics. From 2022 to 2050 public pension expenditure increases, pushed by the increase in the old-age dependency ratio because of the quick ageing of the Spanish population and the retirement of the Spanish baby boom generation. During these decades, a progressive fall in the benefit ratio takes place, especially from 2040 to 2050, although it can only partially counter the demographic trend. The coverage ratio also helps to mitigate the increase in the ratio of pension expenditure, especially during the first decade of the projection. These are the years when the increase in the statutory retirement age is unfolding. This projected policy outcome is reflected in the fall of the early age and old-age coverage ratio component. In the 2030s and 2040s, the cohort component of the coverage rate becomes its main driver, showing the relatively smaller size of the cohorts born after the Spanish baby boom generation. Finally, the labour market effect also puts a downward pressure on the ratio of pension expenditure, especially up to 2040, reflecting the effect of the measures adopted in 2021 to encourage a later retirement. The effect of these measures is reflected in the negative career shift effect up to 2040[25], as well as in a negative employment ratio effect.

From 2050 to the end of the projection, the demographic trend ceases, and the dependency ratio plays no role in the evolution of the public pension expenditure. During these two last decades, public pension expenditure slightly decreases. There are two forces of opposite sign at play. On the one hand, the benefit ratio effect keeps putting downward pressure on public pension expenditure, although with a decreasing magnitude, and becomes the main driver of the public pension expenditure evolution. On the other hand, the coverage ratio effect puts upward pressure on public pension expenditure, specially from 2050 to 2060 due to the cohort effect once the size of the cohorts stabilizes. In the last decades of the projection horizon, the coverage ratio has a neutral impact on the public pension expenditure ratio. Regarding the labour market effect, it has practically no effect from 2050 onwards once the effects of the measures adopted in 2021 have completely wound down and the unemployment rate stabilizes.

3.3.2.   Benefit ratio and replacement rate at retirement

The benefit ratio compares the average pension benefit with the average wage in the economy. The replacement rate compares the average initial benefit of new pensioners to the average final wage prior to retirement. Both metrics show a downward trajectory over the projection horizon.

The total public pension scheme benefit ratio is projected to decline from 64% in 2022 to 51% in 2070 (see Table 13). Up to 2030 the benefit ratio follows an upward trend due to higher growth of the average pension benefit than the average wage. This is caused by an extraordinary high revaluation rate of pre-existing pensions in 2023 and 2024 (8.5% and 3.6% respectively) and by a strong increase in minimum and non-earnings-related pensions up to 2027, in line with recently adopted legislation. On the other hand, from 2030 to 2070 the total public pension scheme benefit ratio is projected to decline as wages grow at a higher rate than pension benefits. Several factors explain this dynamic. First, the revaluation of pre-existing pensions stabilizes at an annual rate of 2%, which is below the projected growth rate for wages. Second, the share of capped old-age pensions increases over time.

The replacement rate follows the same dynamic as the benefit ratio since the evolution of the average pension benefit is crucially affected by the evolution of the initial average pension. However, in contrast to the benefit ratio, the indexation factor of pre-existing pension benefits plays no role in explaining the dynamic of the replacement ratio. The key contributor to this trend is the increasing share of new

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[25] New penalty coefficients for maximum pensions are not fully implemented until 2033. Up to this year, there is a transitional period.

pensions capped at the maximum threshold as maximum contribution bases increase rapidly during the first decades while maximum pension benefits grow less than wages in the economy.

TABLE 13 – BENEFIT RATIO (BR), REPLACEMENT RATE AT RETIREMENT (RR) AND COVERAGE BY PENSION SCHEME (IN %)

	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Public scheme (BR)	64%	69%	64%	56%	52%	51%	-13%
Coverage	100%	100%	100%	100%	100%	100%	0%
Public scheme: old-age earnings related (BR)	70%	76%	69%	60%	55%	54%	-16%
Public scheme: old-age earnings related (RR)	77%	76%	71%	65%	64%	64%	-13%
Coverage	67%	69%	73%	77%	78%	78%	11%
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	3%	11%	16%	17%	17%	17%	14%
Private individual schemes (BR)	:	:	:	:	:	:	:
Private individual schemes (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Total benefit ratio	66%	72%	66%	58%	53%	52%	-14%
Total replacement rate (earnings-related benefits)	:	:	:	:	:	:	:

Coverage of each pension scheme is calculated as a ratio of the number of pensioners within the scheme and the total number of pensioners in the country. In case data on pensioners are not available, the calculation is based on the number of pensions.

Source: European Commission, EPC.

Compared to the AR21, the decline of the old-age earnings related benefit ratio is remarkably lower (16 pp in AR24, 37 pp in AR21). The same applies to the old-age earnings related replacement rate (13 pp in AR24, 36 pp in AR21). This is the result of two main factors. First, in the AR21 pre-existing pensions were revalued according to the IRP which remained at its lower threshold (0.25%). Second, in the AR24 average new pension benefits are higher due to the measures adopted in 2021 and 2022, such as the suppression of the Sustainability Factor, the new incentives scheme to postpone retirement decisions, improvements on the filling of contribution gaps and a higher growth rate of the maximum pension benefit.

3.3.3. Dependency ratio and old-age dependency ratio

The projected evolution of dependency and old-age dependency ratios (see Table 14) reflect the ageing of the Spanish population in the coming decades. The number of workers is projected to increase up to 2040 and then to decline to approximately the same level in 2070 as in 2022. The number of pensioners is expected to increase significantly between 2022 and 2070. This holds particularly true until 2050 due to the retirement of the Spanish baby boom generation. As a result of the above, the system will experience a substantial increase in the pension system dependency ratio (around 30 pp). The projected evolution of the old-age dependency ratio is very similar. Therefore, the system efficiency is projected to slightly decline only after 2030.

Compared to the 2021 Ageing Report, the increase in the dependency and old-age dependency ratios is very similar, although the evolution of the driving forces is different. First, the increase in the number of pensioners is slightly lower in the AR24 (6,206 thousand between 2019 and 2070 in the AR21) even though there is a higher increase in the number of people aged 65+ (5,873 in the AR21), as a result of the measures adopted in 2021 to incentivize a later retirement. Second, the AR24 foresees lower growth in employment rates.

TABLE 14 – SYSTEM DEPENDENCY RATIO AND OLD-AGE DEPENDENCY RATIO

	2022	2030	2040	2050	2060	2070	change 2022-2070
Number of pensioners (thousand) (I)	9984	11137	13493	15605	15999	15637	5652
Employment (thousand) (II)	20581	22119	22208	21311	20671	20099	-481
Pension system dependency ratio (SDR) (I)/(II)	49%	50%	61%	73%	77%	78%	29%
Number of people aged 65+ (thousand) (III)	9636	11692	14648	16505	16176	15797	6161
Working-age population 20-64 (thousand) (IV)	28933	29332	27853	25848	25295	24501	-4432
Old-age dependency ratio (OADR) (III)/(IV)	33%	40%	53%	64%	64%	64%	31%
System efficiency (SDR/OADR)	146%	126%	116%	115%	121%	121%	-25%

Source: European Commission, EPC.

The evolution of the ratio of pensioners to inactive population and to total population is characterized by two features. First, these ratios increase progressively as the baby boom cohorts reach each age group. Second, projected increases in participation rates for older workers lead to increases in the pensioners to inactive population ratios for age groups close to the statutory retirement age (age groups 60-64 and 65-69) and decreases in the ratio of pensioners to total population in those same age groups (Table 15)

TABLE 15 – PUBLIC PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

pensioners / inactive population	2022	2030	2040	2050	2060	2070
Age group -54	5.7	5.8	5.1	5.1	5.3	4.7
Age group 55-59	40.8	56.1	62.1	55.4	59.7	61.2
Age group 60-64	54.8	65.3	80.7	76.6	76.9	78.7
Age group 65-69	84.5	76.6	92.4	95.2	92.4	94.1
Age group 70-74	84.3	83.7	87.5	94.7	93.1	93.0
Age group 75+	89.7	88.7	87.0	91.8	97.5	98.4

pensioners / total population	2022	2030	2040	2050	2060	2070
Age group -54	2.3	2.3	2.0	2.0	2.1	1.9
Age group 55-59	10.0	9.9	9.7	9.4	9.8	10.1
Age group 60-64	25.3	24.3	22.5	21.6	21.6	22.2
Age group 65-69	76.1	59.1	63.5	64.0	62.2	62.9
Age group 70-74	82.4	81.1	83.1	88.7	87.1	86.9
Age group 75+	89.7	88.7	87.0	91.8	97.5	98.4

Source: European Commission, EPC.

The breakdown by gender shows similar patterns although female ratios depict stronger trends in the same direction due to the reduction in the participation gap. Female ratios converge to total ratios for the oldest age groups (Table 16) as a result of the convergence in participation rates between men and women. Additionally, it should also be noted that by 2070 the share of women over total population aged 75+ slightly falls, due to the projected convergence in life expectancy between men and women.

TABLE 16 – FEMALE PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

female pensioners / inactive population	2022	2030	2040	2050	2060	2070
Age group -54	4.9	5.1	4.5	4.5	4.7	4.2
Age group 55-59	28.8	41.0	46.4	42.1	44.8	45.8
Age group 60-64	41.9	55.5	70.9	67.4	66.2	67.3
Age group 65-69	73.3	71.3	90.2	93.5	90.2	91.2
Age group 70-74	72.2	77.7	86.5	94.9	92.8	91.8
Age group 75+	83.9	85.1	87.6	94.9	102.3	103.6

female pensioners / total population	2022	2030	2040	2050	2060	2070
Age group -54	2.1	2.1	1.8	1.9	1.9	1.8
Age group 55-59	9.1	8.9	8.7	8.4	8.7	8.9
Age group 60-64	21.7	22.9	21.3	20.0	19.8	20.2
Age group 65-69	66.8	57.4	64.8	65.4	63.0	63.3
Age group 70-74	71.2	75.9	82.8	89.2	87.2	86.2
Age group 75+	83.9	85.1	87.6	94.9	102.3	103.6

Source: European Commission, EPC.

3.3.4. New public pension expenditure decomposition

New public pension expenditure is the product of the average contributory period, average pensionable earnings, the average accrual rate, the number of new pensions and the sustainability factor[26]. This decomposition tries to assess the consistency of the projections and provides additional insights.

TABLE 17 – BREAKDOWN OF NEW PUBLIC PENSION EXPENDITURE (OLD-AGE AND EARLY EARNINGS-RELATED PENSIONS)

TOTAL	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	3715	5481	9069	11541	14177	21701
I. Number of new pensions (1000)	354.5	426.8	549.8	527.2	458.0	501.7
II. Average contributory period (years)	37.8	38.4	39.4	40.4	41.5	42.6
III. Average accrual rate (%)	2.5%	2.4%	2.2%	2.0%	1.9%	1.9%
IV. Monthly average pensionable earnings (1000 EUR)	1.6	2.0	2.7	3.9	5.6	7.8
V. Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0
VI. Average number of months paid the first year	7.0	7.0	7.0	7.0	7.0	7.0
Monthly average pensionable earnings / monthly economy-wide average wage	70%	70%	70%	70%	70%	70%

MEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	2282	3054	5004	6182	7518	11662
I. Number of new pensions (1000)	200.2	219.9	278.0	254.9	220.2	245.0
II. Average contributory period (years)	40.5	40.9	41.4	42.0	42.5	43.0
III. Average accrual rate (%)	2.3%	2.2%	2.1%	1.9%	1.8%	1.8%
IV. Monthly average pensionable earnings (1000 EUR)	1.8	2.2	3.0	4.4	6.3	8.8
V. Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0
VI. Average number of months paid the first year	7.0	7.0	7.0	7.0	7.0	7.0
Monthly average pensionable earnings / monthly economy-wide average wage	78%	78%	78%	78%	78%	78%

WOMEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	1434	2427	4065	5359	6659	10039
I. Number of new pensions (1000)	154.4	206.8	271.8	272.4	237.8	256.7
II. Average contributory period (years)	34.3	35.6	37.3	38.9	40.5	42.1
III. Average accrual rate (%)	2.9%	2.8%	2.5%	2.2%	2.1%	2.0%
IV. Monthly average pensionable earnings (1000 EUR)	1.3	1.7	2.3	3.3	4.7	6.6
V. Sustainability/adjustment factors	1.0	1.0	1.0	1.0	1.0	1.0
VI. Average number of months paid the first year	7.0	7.0	7.0	7.0	7.0	7.0
Monthly average pensionable earnings / monthly economy-wide average wage	59%	59%	59%	59%	59%	59%

Source: European Commission, EPC.

The number of new pensions is determined by the labour force and participation rates provided by the European Commission's services, which incorporate the effects of all the measures adopted with a potential impact on labour exit behaviour. New pensions reach a peak in the 2040s when the Spanish baby boomers are projected to retire and decrease afterwards in line with the relative cohort size of the next generations.

The average contributory period depends on the dynamics of the labour market and the decision to retire (namely, whether workers decide to retire at the statutory age or before/after that moment). It increases 4.8 years through the projection horizon as a result of higher participation rates for older workers in line with the delay in the statutory and effective retirement ages. Specifically, the incentives mechanism adopted in 2021 leads to a higher increase of the average contributory period compared to the AR21 (3.7 years from 2019 to 2070 in AR21). Moreover, due to the convergence in participation rates between women and men, the increase in the average contributory period for women is greater. However, the

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[26] Since the Sustainability Factor has been abolished, Sustainability/adjustment factor equals 1 for the whole projection period.

gender pay gap remains stable and is reflected in the average pensionable income, which captures past dynamics in nominal wages. Since the model's methodology does not project different wage growth rates by gender, the gender wage gap in the baseline year remains the same throughout the projection period.

Individual accrual rates applied on pensionable income depends on the number of years of contributions of each worker, as explained in Section 1.1.3. The average accrual rate falls during the projection horizon and shows the interplay between average growth of new pensions and changes in contributory periods and in pensionable income. This is consistent with the decrease of the benefit ratio discussed in Section 3.3.2. More precisely, the extension of contributory periods explains the decrease in the implicit average accrual rate. Even if legal accrual rates are the same for men and women, the decline in the average accrual rate is larger for women as a result of the convergence in contributory periods between men and women, as well as the fixed wage gender gap.

3.4. Financing of the pension system

Funding of the public pension system stems from three main sources. First, the contributions of both employers and employees to the Social Security regime. Second, the contributions from civil servants, security forces and the public sector to the *Clases Pasivas* special scheme. Finally, non-earnings-related pensions, the top-up of minimum pensions and any transitory financial imbalance that may arise are covered with direct transfers from the Central Government's budget.

Table 18 shows the main features of contributions both to the general, Social Security regime and to the *Clases Pasivas* special scheme in 2022. The first column shows contribution rates and maximum contribution bases for *Clases Pasivas*. Under this system, the State plays the role of the employer and the system manager. In practice, employees' contribution rate is 3.9% and the Public Sector makes transfers for an amount equal to the remaining balance so that the system is balanced on an annual basis. There is neither a maximum nor a minimum contribution base. Instead, the contribution base for each administrative groups is annually determined by Law. Maximum and minimum contribution cells show the highest and lowest contribution base in the *Clases Pasivas* regime in 2022. The second column shows contribution rates, maximum and minimum contributory bases for the general Social Security system that covers most workers. The third column shows the contribution rules in the special scheme for the self-employed.

TABLE 18 – FINANCING OF THE PUBLIC PENSION SYSTEM IN 2022

	Public employees	Private employees	Self-employed
Contribution base	Annually determined by a Law	Monthly taxable income	They can freely choose their contribution base
Contribution rate/contribution			
Employee	-	23.6%	28.3%
Employer	3.9%	4.7%	-
*State**	-	-	-
*Other revenues**	-	-	-
Maximum contribution	3166.13 €/month	4139.4 €/month	4139.4 €/month
Minimum contribution	1290.89 €/month	960.6 €/month	960.6 €/month

Only legislated contributions are reported.

Source: European Commission, EPC.

The financing of the public pension system is expected to change significantly in the coming years due to measures adopted in 2021, 2022 and 2023 (see section 1.2). First, self-employed will no longer be able to choose their contribution bases. Instead, self-employed's contribution bases will be determined by their annual incomes. Second, contribution rates for employers and employees in the Social Security system will increase due to the progressive deployment of the Intergenerational Equity Mechanism. Finally, the contribution rate for employees will additionally increase due to the solidarity levy.

Table 19 shows the projected revenue of the system during the projection horizon. Public pension contributions are expected to grow 1.7 pp from 2022 to 2050 and 1.1 pp from 2022 to 2070[27]. This dynamic is explained by two factors of opposite sign. First, employer and employee contributions grow up to 2050 and remain constant thereafter due to the measures adopted in 2021 and 2022, such as the IEM, the reform of the contribution system for the self-employed, the solidarity levy and the increase of the maximum contribution bases. Second, state contributions decline almost 1 percentage point from 2022 to 2070. This component includes state transfers to fund the *Clases Pasivas* regime[28]. Since this system is closed to new entrants, it will progressively phase-out.

TABLE 19 – REVENUE FROM CONTRIBUTIONS AND NUMBER OF CONTRIBUTORS IN THE PUBLIC SCHEME

	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Public pension contributions (%GDP)	12.9	13.8	14.3	14.6	14.0	14.0	1.1
Employer contributions	*8.9*	*9.6*	*10.0*	*10.5*	*10.3*	*10.5*	*1.6*
Employee contributions	*1.8*	*1.9*	*2.0*	*2.1*	*2.1*	*2.1*	*0.3*
*State contribution**	*1.8*	*2.0*	*1.9*	*1.7*	*1.3*	*1.0*	*-0.8*
*Other revenues**	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.0*
Number of contributors (I) (1000)	23636	24796	24414	22811	22094	21478	-2159
Employment (II) (1000)	20581	22119	22208	21311	20671	20099	-481
(I) / (II)	115%	112%	110%	107%	107%	107%	-0.1

Includes only legislated contributions.

Source: European Commission, EPC.

In the AR21 total public pension contributions were projected as a fixed share of GDP. Nonetheless, this assumption would not properly reflect the sustainability of the public pension system, as major reforms aimed at increasing revenues have been put in place. Instead, the AR24 incorporates a new module to properly assess the effects of the measures adopted in 2021, 2022 and 2023 on the revenue projections (see section 4.3).

3.5. Sensitivity analysis

The results of the baseline rely on a set of demographic, macroeconomic and policy assumptions. Changes in those assumptions lead to different results. To test the sensitivity of the baseline to changes in its assumptions, several alternative scenarios have been projected. These alternative scenarios can be grouped into three blocks:

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[27] This projection includes the effects of the measures adopted in the latest pension reform, as well as other measures with a potential impact on public pension contributions, such as the increase of the minimum wage, the labour market reform or new jobs emerging from the informal economy.

[28] It also includes the funding of non-earnings-related pensions and the top-up of the minimum pension.

- Demographic scenarios: 2 years increase in life expectancy at birth by 2070, 33% less/more non-EU immigration over the entire projection period, 20% lower fertility rate over the entire projection period.

- Macroeconomic scenarios: inflation rate converges to 2% by T+30, employment rate of older workers (55-74y) 10 pps higher than assumed in the baseline projection, TFP growth converges to 0.6%/1.0% instead of 0.8%.

- Pension policy scenarios: effective retirement age shifts in line with 3/4th of the expected change in life expectancy, the early and statutory retirement age are frozen at the situation in 2023 and limit to the fall in the benefit ratio of the system to 90% of the level in the base year.

Table 20 summarizes the results for both public pension expenditure and total pension expenditure (public and private).

TABLE 20 – EXPENDITURE PROJECTIONS UNDER DIFFERENT SCENARIOS (PPS DEVIATION FROM BASELINE)[29]

Public pension expenditure	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Baseline (%GDP)	13.1	14.3	16.2	17.3	16.9	16.7	3.6
Higher life expectancy at birth (+2y)	0.0	0.0	0.2	0.4	0.6	0.8	0.8
Higher migration (+33%)	0.0	-0.3	-0.7	-1.1	-1.2	-1.0	-1.0
Lower migration (-33%)	0.0	0.3	0.8	1.4	1.6	1.4	1.4
Lower fertility (-20%)	0.0	0.0	0.0	0.2	0.6	1.1	1.1
Higher inflation scenario (2% by 2052)	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Higher employment rate of older workers (+10 pps)	0.0	-0.9	-1.7	-1.4	-1.2	-1.2	-1.2
Higher productivity (TFP converges to 1%)	0.0	0.0	0.0	-0.1	-0.3	-0.6	-0.6
Lower productivity (TFP converges to 0.6%)	0.0	0.0	0.2	0.6	0.9	1.0	1.0
Policy scenario: link retirement age to longevity	0.0	0.0	0.0	-0.5	-1.0	-1.9	-1.9
Policy scenario: constant retirement age	0.0	1.3	2.9	2.6	2.1	2.1	2.1
Policy scenario: constant benefit ratio	0.0	0.0	0.0	0.5	2.0	2.3	2.3

Total pension expenditure	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Baseline (%GDP)	13.4	14.9	16.7	17.6	17.1	16.9	3.5
Higher life expectancy at birth (+2y)	0.0	0.0	0.2	0.4	0.6	0.8	0.8
Higher migration (+33%)	0.0	-0.3	-0.7	-1.1	-1.2	-1.0	-1.0
Lower migration (-33%)	0.0	0.4	0.8	1.4	1.6	1.4	1.4
Lower fertility (-20%)	0.0	0.0	0.0	0.2	0.6	1.1	1.1
Higher inflation scenario (2% by 2052)	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Higher employment rate of older workers (+10 pps)	0.0	-0.9	-1.7	-1.5	-1.2	-1.2	-1.2
Higher productivity (TFP converges to 1%)	0.0	0.0	0.0	-0.1	-0.3	-0.6	-0.6
Lower productivity (TFP converges to 0.6%)	0.0	0.0	0.2	0.6	0.9	1.0	1.0
Policy scenario: link retirement age to longevity	-0.1	0.0	0.0	-0.5	-1.0	-1.9	-1.8
Policy scenario: constant retirement age	0.0	1.3	2.9	2.6	2.1	2.1	2.1
Policy scenario: constant benefit ratio	0.0	0.0	0.0	0.5	2.0	2.3	2.3

Source: European Commission, EPC.

3.5.1. Demographic scenarios

Changes in the demographic assumptions are best observed in the effective economic old-age dependency ratio (inactive population aged 65+/ employed persons aged 20-64), which incorporates not only the effects of these assumptions on the demography projections but also its side effects on the labour market outcomes.

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[29] For more information on the design of the sensitivity scenarios, see Chapter 5 of Part 1 in European Commission and EPC (2023), '*2024 Ageing Report: Underlying assumptions and projection methodologies*', European Economy, Institutional Paper 257.
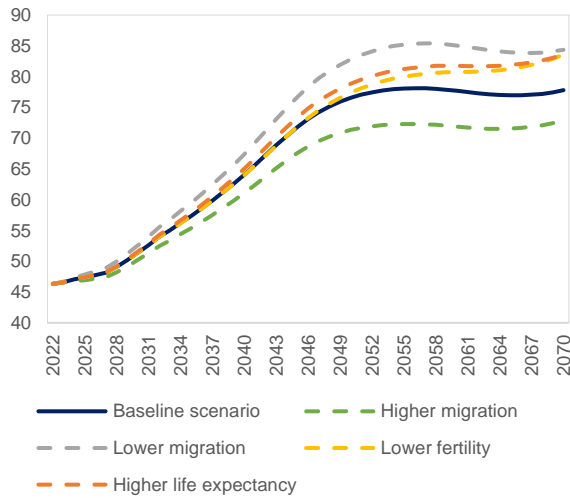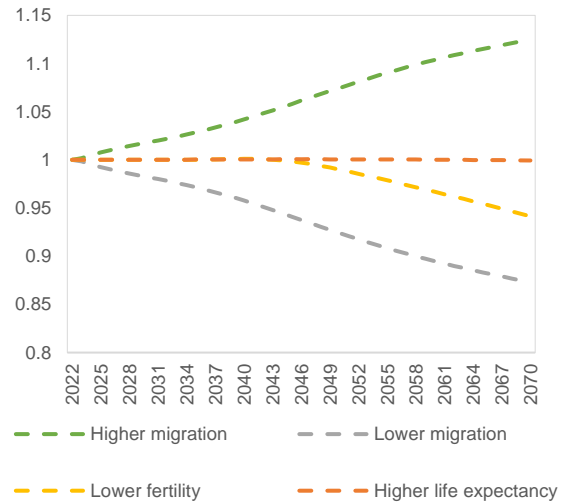
FIGURE 15 – NOMINAL GDP IN EACH SCENARIO / NOMINAL GDP IN THE BASELINE

Source: Spanish General Directorate for Macroeconomic Analysis

An increase in migration inflows improves the effective economic old-age dependency ratio due to higher employment than in the baseline. Specifically, there are more people of working age in the economy which entails a higher number of employees (+2.7 million in 2070 than in the baseline). This leads to a higher growth rate of nominal GDP and therefore to a reduction of the public pension expenditure ratio of 1 pps in 2070. It should be noted that the extra inflows of migrants in the higher migration scenario progressively age, entailing a higher number of pensioners in the long run. Conversely, a reduction in migration inflows has the opposite effect and leads to an increase of the public pension expenditure ratio of 1.4 pps in 2070.

The lower fertility scenario takes more time to diverge from the baseline. Thus, the old-age dependency ratios are very similar up to 2048. From that point on, the accumulated drop in fertility becomes apparent and the labour force shrinks compared to the baseline. The effect of this scenario on the labour force ends up being similar to the one observed in the lower migration scenario, although the impact on pension expenditure is lower due to a lower reduction in nominal GDP.

The last demographic scenario is an additional increase of two years in life expectancy at birth. This leads to a higher number of pensioners, since they remain alive for a longer period of time. The macroeconomic scenario remains unchanged with respect to the baseline. Therefore, differences in the old-age economic dependency ratio come solely from the number of inactive people aged +65. The pension expenditure ratio in this scenario is 0.8 pps higher in 2070 than in the baseline. This difference is much higher than in the AR21 due to the abolition of the sustainability factor.

3.5.2. Macroeconomic scenarios

The two TFP scenarios show impacts of opposite sign through two main channels. On the one hand, a higher (lower) TFP results in higher (lower) GDP growth (Figure 17) that lowers (increases) pension expenditure as a share of GDP. On the other hand, higher (lower) TFP leads to higher (lower) wages and average pensions (Figure 16) which in turn increase (decrease) pension expenditure. In the projections, the former effect is greater than the latter. Higher TFP growth results in a 0.6 pp decrease in expenditure as a share of GDP by 2070 and lower TFP growth results in a 1 pp increase in expenditure as a share of GDP by 2070. These scenarios are not completely symmetrical. Namely, the lower TFP scenario diverges sooner and more from the baseline than the higher TFP scenario.

FIGURE 17 – ANNUAL GROWTH RATE OF THE TFP
(%) UNDER DIFFERENT SCENARIOS

FIGURE 16 – AVERAGE OLD-AGE PENSION BENEFIT UNDER EACH SCENARIO / AVERAGE OLD-AGE PENSION BENEFIT IN THE BASELINE
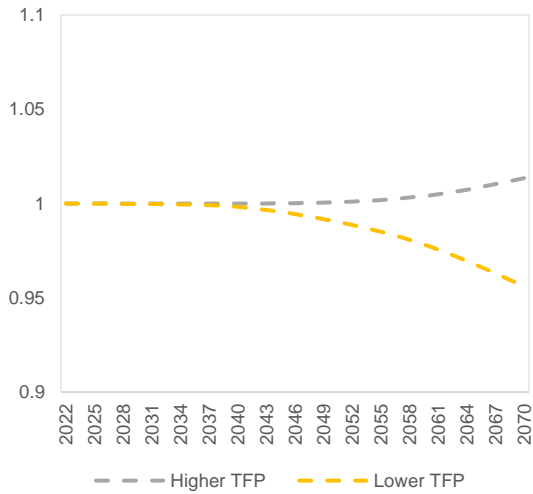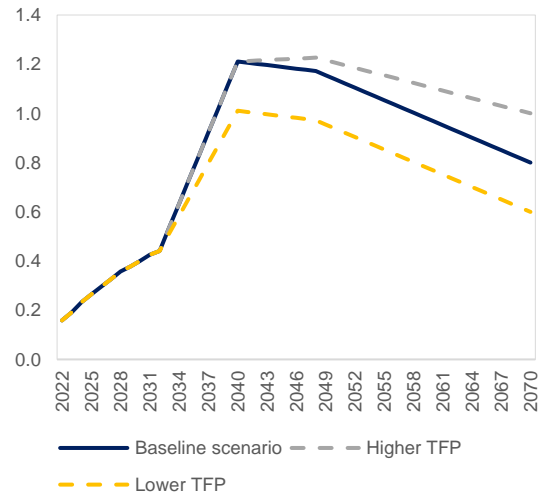
FIGURE 17 – ANNUAL GROWTH RATE OF THE TFP (%) UNDER DIFFERENT SCENARIOS

Source: Spanish General Directorate for Macroeconomic Analysis

When participation rates of workers aged 54 and above are increased, the numerator (expenditure) and denominator (GDP) effects work in the same direction (Figure 18). In what refers to the numerator, two forces of opposite sign take place. First, higher participation rates of older workers mean that the effective retirement age is delayed, reducing the average share of life spent in retirement and therefore the number of pensioners. Second, longer careers result in higher average new pension benefits. In the projections, the former effect is greater than the latter, which leads to a reduction in nominal pension expenditure with respect to the baseline. Regarding the denominator, higher participation rates lead to more economic growth. All in all, both effects lead to lower pension expenditure as a share of GDP. The impact is greatest around 2040 (-1.7 pp) and shrinks afterwards in line with the difference in 55-74 employed population (Figure 19), although it remains sizeable (-1.2 pp in 2070).

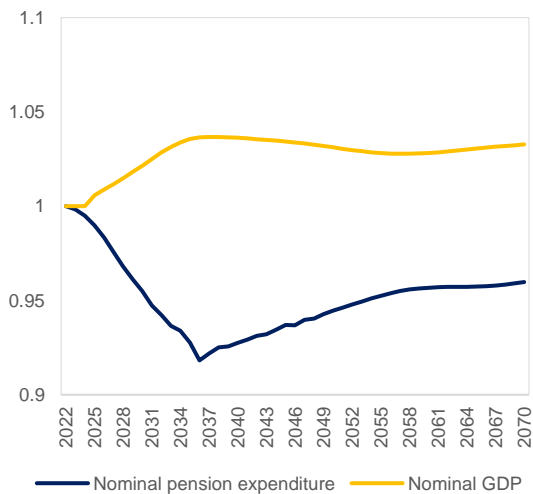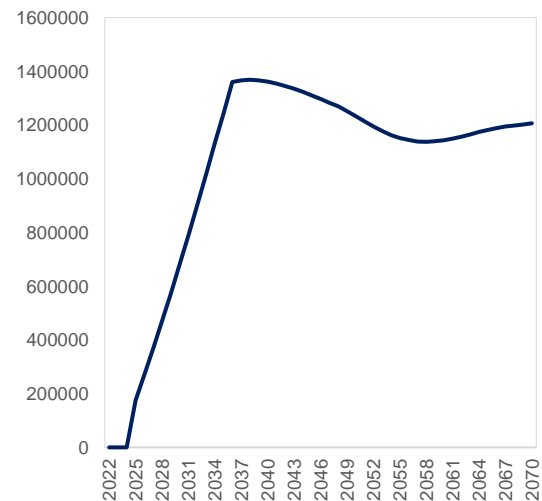FIGURE 18 – NOMINAL PENSION EXPENDITURE AND NOMINAL GDP RATIO TO THE BASELINE

FIGURE 19 – DIFFERENCE IN 55-74 EMPLOYED POPULATION WITH RESPECT TO THE BASELINE

Source: Spanish General Directorate for Macroeconomic Analysis

The last macroeconomic scenario assumes a higher inflation rate for longer. Namely, inflation rate converges to 2% in 2052, in contrast to the baseline in which it converges to 2% in 2027. Under this scenario, pension expenditure as a share of GDP declines with respect to the baseline. Although pension benefits are linked to the CPI, the GDP deflator increases more than the CPI (Figure 20) relative to the baseline. Consequently, the denominator of the pension expenditure ratio grows more than the numerator (Figure 21), leading to a lower pension expenditure as share of GDP.

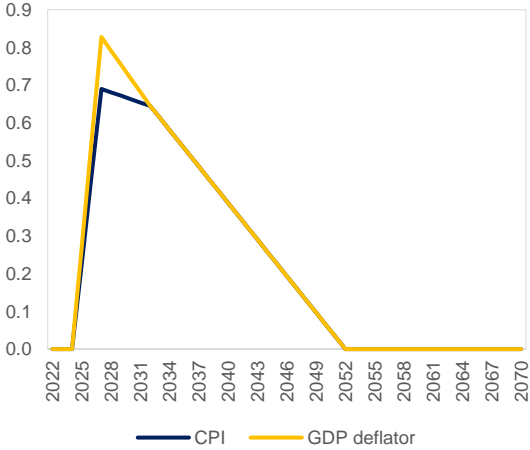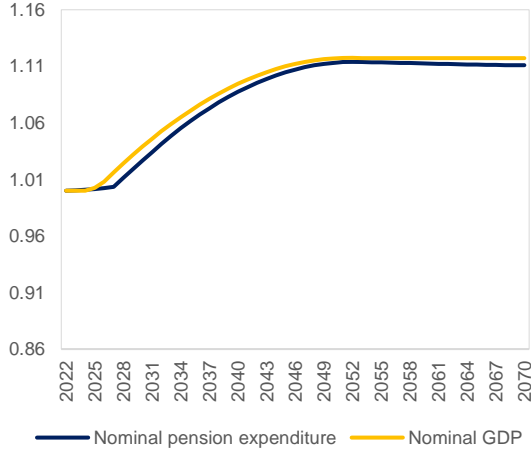FIGURE 20 – DIFFERENCE IN GDP DEFLATOR AND CPI GROWTH RATES WITH RESPECT TO THE BASELINE

FIGURE 21 – NOMINAL PENSION EXPENDITURE AND NOMINAL GDP RATIO TO THE BASELINE

Source: Spanish General Directorate for Macroeconomic Analysis

Finally, it is worth noting that long-term pension projections are among others driven by the 'non-accelerating wage rate of unemployment' (NAWRU) assumptions. The Ageing Report baseline methodology could imply non-intuitive NAWRU paths for some countries such as Spain, as it implicitly projects a future shock that will negatively affect the Spanih labour market. Thus, an alternative approach to the NAWRU converge path based on a linear converence to the long term anchor would lead to slightly different projection results and subsequent economic policy implications. This alternative approach is not included in this report.

Box 3.5.A Scenario with the latest macroeconomic figures

The macroeconomic assumptions for the 2024 Ageing Report were agreed in the spring of 2023 by the AWG and subsequently endorsed by the EPC in July 2023. Up to 2032, economic growth figures are determined by the 2023 Commission spring forecast and the associated T+10 projections, in accordance with previous cycles. The Commission 2023 spring forecast was published on May 15th, 2023, and took account of all available information at that time. As in previous Ageing Report cycles, this procedure implies that the underlying assumptions of the Ageing Report are based on a cut-off date (spring 2023) which may differ from the latest available data at the time of publication (spring 2024).

Considering the process of preparing the budgetary projections, there is an unavoidable discrepancy between the underlying assumptions in the Ageing Report and the latest available data at the time of the submission of the expenditure projections (autumn 2023). Since the focus of the Ageing Report is very much on the long term, revisions for the starting point generally do not bear substantial consequences for the budgetary projections. However, during this Ageing Report cycle, deviations between the cut-off date and the elaboration of this fiche have been higher because of two main factors.

First, the autumn 2023 update of the national accounts for 2022 and earlier years brought larger than usual revisions in many countries. In the case of Spain, after the statistical revision by the Spanish National Statistical Office, the 2022 nominal GDP level is 1.5% higher than what was initially reported (1346.4 billion euros in the 2023 Autumn Forecast instead of 1327.1 billion euros as published in the 2023 Spring Forecast).

Second, 2023 has been marked by strong inflationary pressures and very large GDP deflator forecast errors. The 2023 Spring Forecast forecasted a GDP deflator growth for Spain of 4.4% for 2023. Then, the 2023 forecast was revised substantially upwards by the Commission in its 2023 Autumn Forecast with a GDP deflator growth projected to be 5.3% in 2023. Large GDP deflator short-term forecast errors have strong implications for long-term pension expenditure ratios. Indeed, in the Spanish pension system pension benefits are indexed to inflation (CPI) of the previous year. Therefore, the baseline expenditure projection incorporates the actual revaluation rate for 2023, since it was available at the time of elaboration of this fiche. In other words, the numerator of the pension expenditure to GDP ratio is fed with the observed past CPI data. However, 2023 nominal GDP in the baseline which feeds into the denominator of the pension expenditure to GDP ratio does not incorporate the latest figures, neither on GDP deflator growth nor on real GDP growth. As a result, the baseline pension expenditure-to-GDP ratio projection could be slightly over-estimated from the start of the projection period (2022 and 2023).

Given these revisions, this box includes a sensitivity analysis on how the baseline projection would change when using the latest available information until 2023 as reported in the 2023 Autumn Forecast. The methodology for this alternative scenario is as follows. First, nominal GDP figures for 2022 and for 2023 are replaced by the values reported in the 2023 Autumn Forecast. Then, nominal GDP for all projection years (i.e., 2024-2070) is rescaled by applying the same growth rates as in the macroeconomic scenario as agreed by the Ageing Working Group in June 2023 and endorsed by the EPC in July 2023 to the revised 2023 figure.

As shown in Figure 22 public pension expenditure as share of GDP declines 0.5 pp in 2050 and 0.4 pp in 2070 with respect to the baseline scenario. In all, public pension expenditure as share of GDP averages 15.6% in the period 2022-2070, and 15.1% in the period 2022-2050.

FIGURE 22 – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER THE SCENARIO WITH THE LATEST MACROECONOMIC FIGURES (AUTUMN FORECAST 2023)
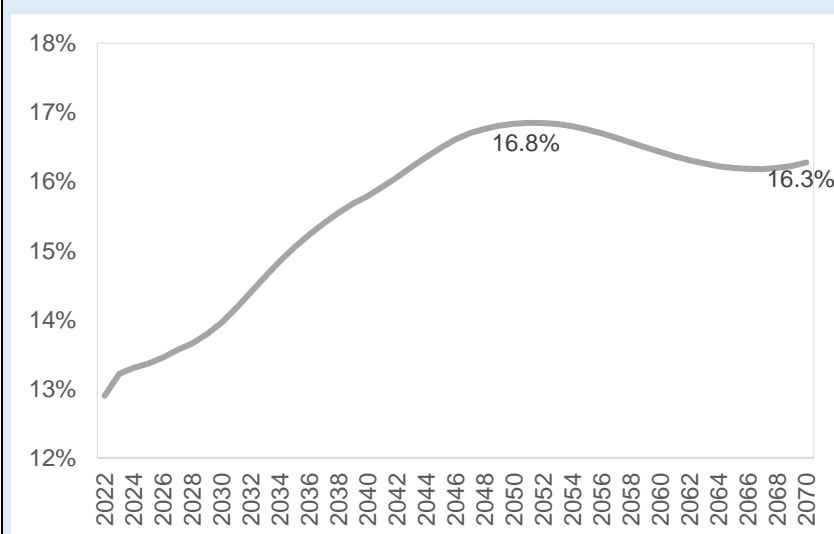
Source: European Commission's 2023 Autumn Forecast and Spanish General Directorate for Macroeconomic Analysis

3.5.3. Policy scenarios

The scenarios where the statutory retirement age either stays fixed at its 2023 level or varies with life expectancy test how pension expenditure would change if statutory and effective retirement ages were to change. In the first case, fixing the statutory retirement age at the 2023 level (66 years and 4 months) for the whole projection horizon increases expenditure by 2.1 pp by 2070 with respect to the baseline. In this scenario the labour force would be lower (leading to less economic growth) and nominal pension expenditure would be higher due to longer average spells in retirement. In the second case, the effects are the opposite and pension expenditure decreases 1.9 pp in 2070.

The last policy scenario explores the implication of a floor on the total benefit ratio (the ratio between the total average pension benefit and the average wage in the economy). In this scenario, it is assumed that the total benefit ratio could not go below 90% of its initial level. To do so, an alternative index for pre-existing pensions guarantees that the annual benefit ratio hovers around 90% of the 2022 level (Figure 23). This entails that the average pension benefit in this alternative scenario grows more than in the baseline (Figure 24**FIGURE 24**) once the benefit ratio reaches 90% of its initial level (2048). The result is an increase in pension expenditure of 2.3 pp by 2070 compared to the baseline projection.

FIGURE 23 – TOTAL BENEFIT RATIO UNDER DIFFERENT SCENARIOS
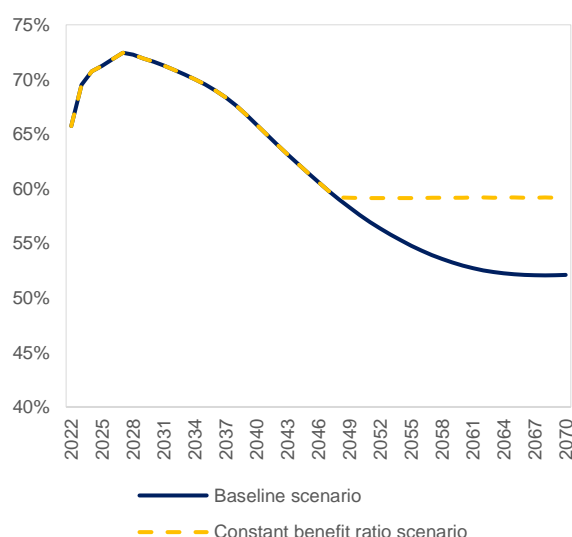
FIGURE 24 – ANNUAL GROWTH RATE OF THE AVERAGE PENSION BENEFIT (%) UNDER DIFFERENT SCENARIOS
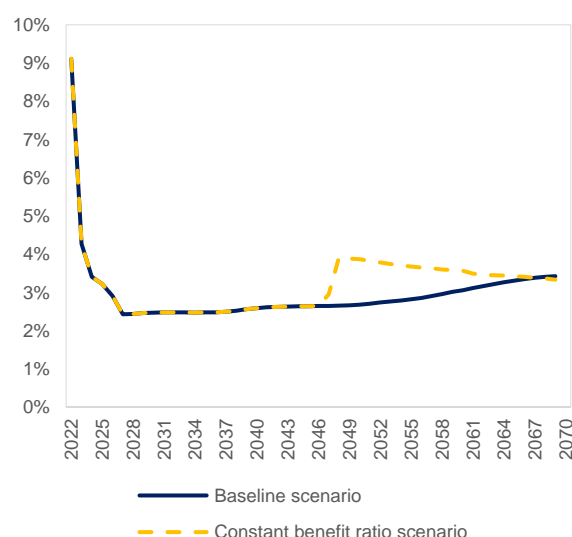
Source: Spanish General Directorate for Macroeconomic Analysis

3.6. Changes in comparison with previous Ageing Report projections

The central projections of this edition of the Ageing Report present a different broad picture compared to the previous editions of the report. Whereas in the last four editions (2021, 2018, 2015 and 2012) the ratio of public pensions to GDP were expected to fall by the end of the projection period compared to the baseline year, in this report public pension expenditure in 2070 is projected to be 3.6 percentage points of GDP higher than in 2022 (Table 21).

	Public pension expenditure	Dependency ratio effect	Coverage ratio effect	Benefit ratio effect	Labour market effect	Residual (incl. interaction effect)
2006 Ageing Report (2004-2050)	**7.0**	12.4	-2.3	-0.8	-1.8	-0.5
2009 Ageing Report (2007-2060)	**6.7**	10.7	-0.9	-1.7	-0.9	-0.5
2012 Ageing Report (2010-2060)	**-0.4**	8.9	-1.2	-4.8	-2.1	-1.2
2015 Ageing Report (2013-2060)	**-0.8**	8.9	-0.6	-4.4	-3.8	-0.9
2018 Ageing Report (2016-2070)	**-1.5**	7.6	-0.4	-4.9	-2.8	-0.9
2021 Ageing Report (2019-2070)	**-2.1**	9.2	-0.1	-8.3	-2.1	-0.8
2024 Ageing Report (2022-2070)	**3.6**	10.5	-0.3	-3.9	-2.0	-0.7

- The disaggregation for 2006/2009/2012 is on the basis of the number of pensions; for the other vintages it is on the basis of pensioners.

- The projection horizon has been extended over consecutive Ageing Reports, limiting comparability over time.

Source: European Commission, EPC.

The main forces at play driving the evolution of public pension expenditure remains broadly unchanged from previous reports. First, there is an upward pressure on public pension expenditure due to the ageing of the population, captured by the dependency ratio. Second, the reduction in the benefit ratio mitigates the ageing effect. Therefore, the different trend over time shown by the public pension expenditure in this report is not caused by the direction but by the magnitude of these effects. Specifically, the dependency ratio effect is expected to be more intense due to a less favourable demographic projection. At the same time, the benefit ratio effect is expected to be quantitatively less important than in previous report, especially weaker than in the AR21 due to the suppression of the IRP and the SF. Therefore, and despite a somewhat higher coverage ratio effect, public pension expenditure is projected to increase over the projection horizon, compared with a decrease in the previous updates.

Table 22 compares the projections of the 2021 Ageing Report with actual observed public pension expenditure between 2019 (the previous base year) and 2022 (the new base year). Differences between the 2021 projections and the outcome figures have been notably small. The coverage of projections and the constant policy assumptions have remained broadly unchanged. In 2020 and 2021 the actual public pension expenditure was 0.1 pps higher than initially projected in the 2021 Ageing Report due to differences in the assumptions used to elaborate these projections. This is the result of two driving forces of opposite sign. On the one hand, nominal GDP growth rates in these years have been lower than projected in the AR2021 due to the severe impact of the COVID-19 crisis. On the other hand, the number of pensioners has been lower than what was projected in the 2021 Ageing Report due to the temporary peak in mortality rates during the pandemic. The former effect has been greater than the latter, leading to a higher pension expenditure-to-GDP ratio during these years. In 2022, there have been several differences in the macroeconomic assumptions that have affected the projection. First, real GDP growth rate was higher than projected in the AR2021, reflecting the strong recovery from the COVID-19 pandemic (Figure 25). Second, inflationary pressures have result in a much higher GDP deflator (Figure 27) and CPI than projected in the AR2021. Therefore, nominal GDP (Figure 26) and nominal pension expenditure[30] have been notably higher than what was projected. All in all, differences in macroeconomic assumptions would have reduced the pension expenditure ratio by 0.5 pps. However, the suppression of the IRP and the indexation of pension benefits to the CPI were approved in 2022. This policy change led to higher growth rates[31] of pension benefits in comparison to the AR2021, in

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[30] In the AR2021, the cap and floor for new pensions were already indexed to CPI. A revaluation rate of 1.4% was projected for 2022. The actual revaluation rate in 2022 was 2.5% for the cap for new pensions, and 3% for the floor for new pensions.

[31] A growth rate of 2.5% was approved in 2022 for pre-existing pensions, whereas the growth rate used in the AR2021 was 0.25%.

which the IRP was still used to revalue pre-existing pension benefits from 2022 onwards (Figure 28). There was also an extraordinary revaluation of non-earnings-related pension benefits. These policy changes have increased public pension expenditure as a share of GDP by 0.4 pps in 2022 (Table 22).

TABLE 22 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 PROJECTIONS AND ACTUAL PUBLIC PENSION EXPENDITURE IN 2019-2022 (%GDP)

	2019	2020	2021	2022
Ageing Report 2021 projections (%GDP)	12.3	14.0	13.4	13.2
Assumptions (pps of GDP)	0.0	0.1	0.1	-0.5
Coverage of projections (pps of GDP)	0.0	0.0	0.0	0.0
Constant policy impact (pps of GDP)	0.0	0.0	0.0	0.0
Policy-related impact (pps of GDP)	0.0	0.0	0.0	0.4
Actual public pension expenditure (%GDP)	12.3	14.1	13.5	13.1

Source: European Commission, EPC.

FIGURE 25 – ANNUAL REAL GDP GROWTH RATE
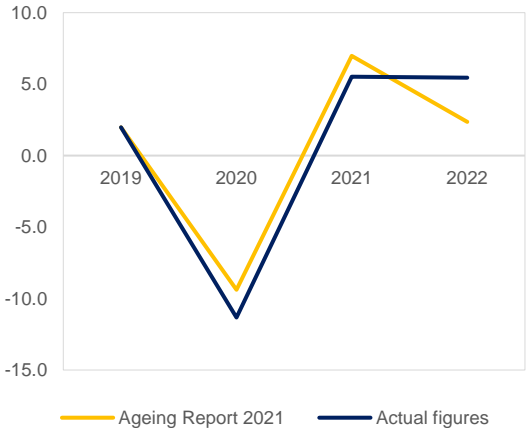
FIGURE 26 – NOMINAL GDP (BILLION €)
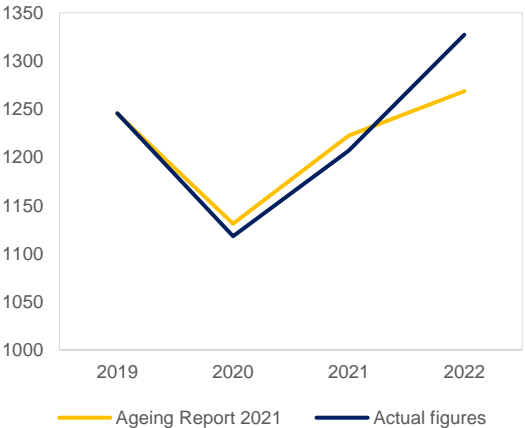
FIGURE 27 – GDP DEFLATOR (ANNUAL GROWTH RATE)
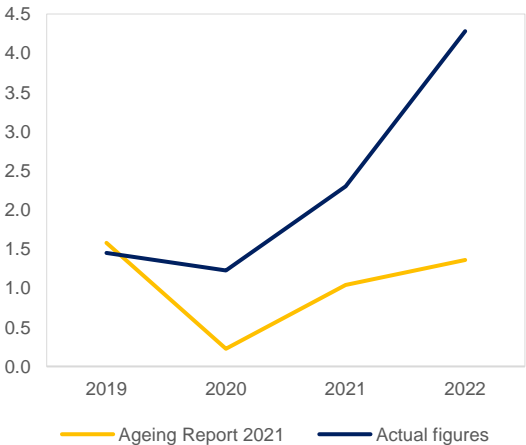
FIGURE 28 – REVALUATION RATE IN 2022[32]

Source: Spanish General Directorate for Macroeconomic Analysis

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[32] The initial revaluation rate for non-earnings-related pensions in 2022 was 4.6%. An extraordinary revaluation rate of 20.3% with respect to 2021 was applied from July to December 2022. Figure 28 shows the annual average revaluation rate in 2022 with respect to 2021.

Table 23 breaks down the difference between the AR21 and the AR24 projections into different components. First, changes in assumptions refer to the impact of changing the demographic and macroeconomic scenario. The macroeconomic and demographic assumptions of the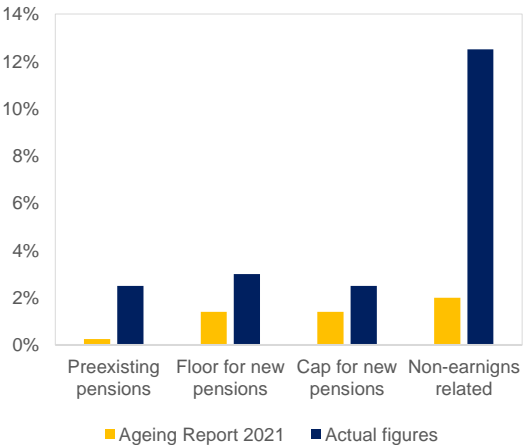 AR24 lead to higher expenditure from the 2040s onwards. Although strictly speaking the macroeconomic scenario and the demographic projections are very similar in the AR21 and the AR24, the new bonus/malus scheme has a positive impact on participation rates and therefore on nominal GDP. This impact on nominal GDP is accounted as part of the policy-related changes effects (Table 23). Therefore, it is necessary to remove it from the 2024 Ageing Report macroeconomic scenario to correctly assess the effects of the change in assumptions (Table 23).

Second, the coverage of the model remains the same as in the 2021 Ageing Report. Yet, several methodological improvements have been implemented. First, a new module to obtain average new old-age pension benefits has been developed. This new module allows to properly incorporate the effects of measures adopted in the last pension system reform (see section 4.3). Second, the methodology to obtain *Clases Pasivas* projections has been refined and now takes into account administrative data provided by the mutual societies of this regime. Third, the methodology to project the share of new old-age pensions which are capped at the maximum pension benefits has been improved. The new methodology is based on microdata and incorporates all the legal changes adopted in the last pension reform. Finally, some minor refinements have been implemented, such as a better linking between widow(er)s' pension projections and old-age pension benefits.

Finally, the policy-related changes component incorporates the effects of the measures adopted in the last pension system reform. These policy changes explain most of the differences with respect to the 2021 Ageing Report projections (see Box 3.6.A.).

TABLE 23 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 AND THE NEW PUBLIC PENSION PROJECTIONS (%GDP)

	2022	2030	2040	2050	2060	2070
Ageing Report 2021 projections	13.2	12.3	12.8	13.0	11.7	10.3
Change in assumptions (pps of GDP)	-0.5	-0.4	0.6	0.2	0.2	0.9
Improvement in the coverage or in the modelling (pps of GDP)	0.0	0.8	0.8	0.8	0.9	0.5
Change in the interpretation of constant policy (pps of GDP)	0.0	0.0	0.0	0.0	0.0	0.0
Policy-related changes (pps of GDP)	0.4	1.6	2.0	3.3	4.1	5.0
New projections	13.1	14.3	16.2	17.3	16.9	16.7

Source: European Commission, EPC.

Box 3.6.A Impact of the 2021-2023 pension reform on expenditure projections

The measures adopted in 2021 and 2023 put upward pressure on public pension expenditure. To properly estimate the effects of these measures, it is necessary to build a counterfactual scenario. Therefore, the starting point of this analysis is the public pension expenditure projection based on a scenario without the adopted measures in 2021 and 2023. Namely, the assumptions used in this counterfactual scenario are the following:

- Pre-existing pension benefits are indexed annually using the IRP, as foreseen by the preceding legislation. Therefore, the 8.5% revaluation rate applied in 2023 is not incorporated.

- The Sustainability Factor (SF) is applied as of 2023, as foreseen by the preceding Law.

- The preceding bonus/malus scheme is applied.

- The computed pensionable income used to calculate the old-age pension benefit is obtained as indicated in the preceding Law. Namely, the computed pensionable income is the average of the last 300 contribution bases. Besides, the preceding rules to cover contribution gaps in the worker's profile are used.

- The cap for new pensions is indexed to the CPI, as assumed in the 2021 Ageing Report. The cap for the contributory bases is also indexed to the CPI.

- The floor for new pension is indexed to the CPI until 2057 and with nominal wage growth thereafter. Non-earnings-related pension benefits grow in line with nominal wages. These assumptions remain unchanged with respect to the 2021 Ageing Report. The floor to the contributory bases is indexed to the CPI.

In this scenario, public pension expenditure would reach a peak in 2044 of 14.4%. Once the upward pressure caused by the retirement of the baby boom generation eases, public pension expenditure as a share of GDP declines, reaching 14% of GDP in 2050 and 11.7% of GDP in 2070 (Figure 29).

Replacing the IRP with the current CPI indexation rule has a substantial impact on public pension expenditure. Whereas the projected value of the IRP stays at its floor of 0.25%, the revaluation rates under the CPI indexation rule are much higher (8.5% in 2023, 3.6% in 2024, 2.7% in 2025, 2.5% in 2026, 2.2% in 2027 and 2% for the rest of the projection period). This results in a 3.4 pp increase of public pension expenditure as a share of GDP by 2050 compared to the preceding law scenario[33]. The abolition of the SF leads to higher new old-age pensions throughout the projection horizon and greater aggregate expenditure on public pensions (0.9 pp in 2050 and 1.7 pp in 2070).

FIGURE 29 – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER DIFFERENT SCENARIOS
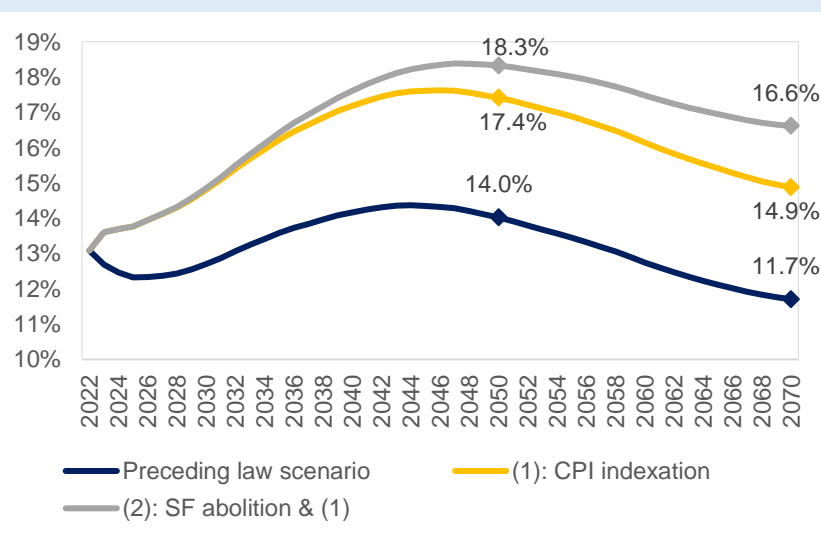
Source: Spanish General Directorate for Macroeconomic Analysis

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[33] This difference is higher than estimated in the 2021 Ageing Report. The reason is that the revaluation rates used in the alternative indexing rule scenario of the 2021 Ageing Report (see Box 3.2.B of the Spanish fiche accompanying the 2021 Ageing Report) were lower. Specifically, it incorporated a revaluation rate of 0.9% for 2021, 1.4% in 2022, 1.7% in 2023 and 2% for the rest of the projection period. It is worth noting that the revaluation rates used in the 2021 Ageing Report for biennium 2021-2022 were lower than the actual revaluation rates (2.5% for both years).

The new bonus/malus scheme partially mitigates the increase on public pension expenditure caused by these two measures. Two forces of opposite sign apply. On the one hand, the number of pensioners declines and GDP increases due to higher participation rates of the oldest cohorts (see Box 2.2.A). This puts a downward pressure on public pension expenditure. On the other hand, average new pension benefits are higher since people shift their behaviour to benefit from the new bonus/malus scheme. The former effect prevails over the latter, leading to a 1.4 pp reduction of public pension expenditure as a share of GDP by 2050, shrinking to 1 pp by 2070 (Figure 30).

It is worth noting that under this new scenario, public pension expenditure reaches a peak in 2051, that is 7 years later than in the preceding law scenario. Because more people decide to postpone their retirement, the distribution of the number of pensions shifts to the future. In other words, people who decide not to retire at this moment will do it sometime in the future.

FIGURE 30 – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER DIFFERENT SCENARIOS
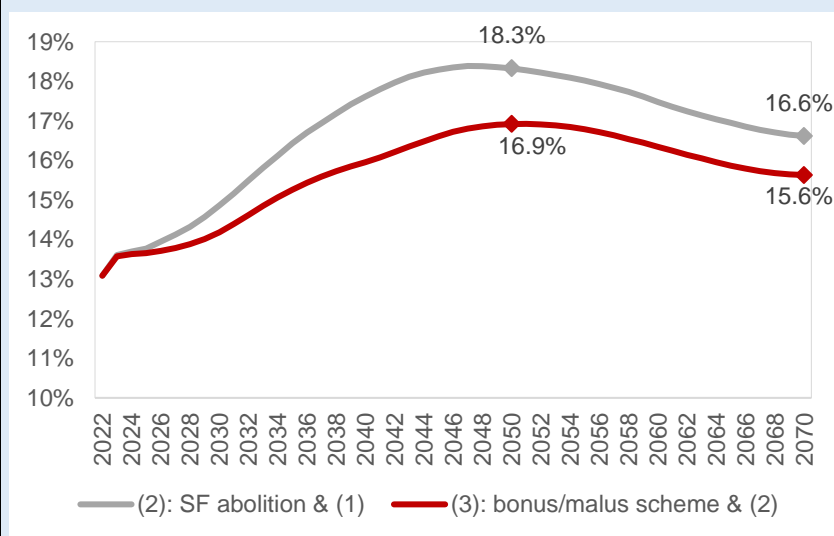
Source: Spanish General Directorate for Macroeconomic Analysis

The new legislation is more favourable in what refers to the computed pensionable income. First, as of 2044 the length extent of the computed pensionable income will be shifted to the sum of the best 324 contribution bases in the last 348 prior to retirement. Until then, a gradual scheme will apply under which new retirees can choose between the preceding and the current law. Therefore, up to 2044, no one will be negatively affected by this measure. Second, the integration of contribution gaps has been improved for all women and for those men who are eligible to receive the gender-gap complement. These two measures result in a 0.2 pp increase in public pension expenditure as a share of GDP in 2050 and 2070.

Source: Spanish General Directorate for Macroeconomic Analysis

New indexation rules for the caps on contributory bases and on pension benefits also have an impact on public pension expenditure. First, the new legislation entails a higher growth rate for the caps on contributory bases[34]. This measure increases revenues for the system, but also leads to a higher pension expenditure since the computed pensionable income for those workers whose contribution bases are capped will be higher. Indeed, the share of pensioners receiving the maximum pension benefit will be higher. Second, the cap on pension benefits will grow at a higher rate than in the counterfactual scenario, especially during the period 2051-2065. All in all, these two measures lead to a 0.1 pp increase of public pension expenditure as a share of GDP in 2050.

The most noteworthy effect of these measures takes place at the very end of the projection period. Namely, the higher share of pensioners receiving the maximum pension benefit and the high growth rates of the maximum pension benefit during 2051-2065, lead to a 0.8 pp increase of public pension expenditure as a share of GDP in 2070.
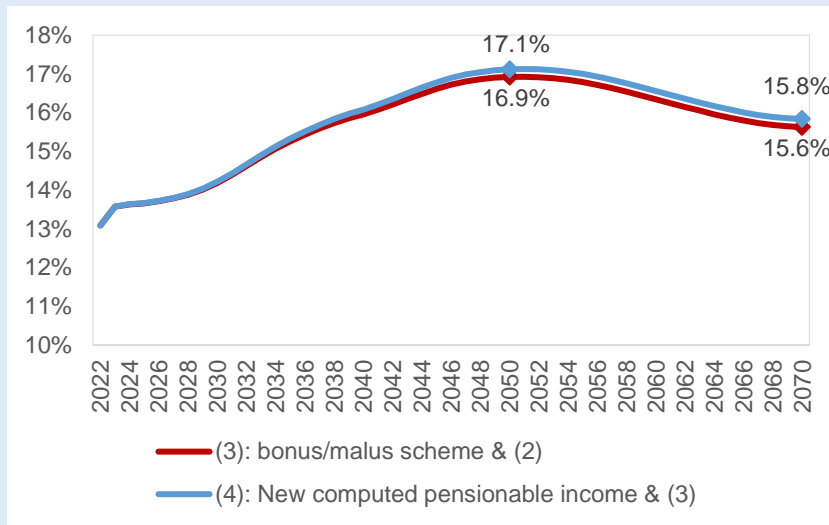
FIGURE 32 – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER DIFFERENT SCENARIOS
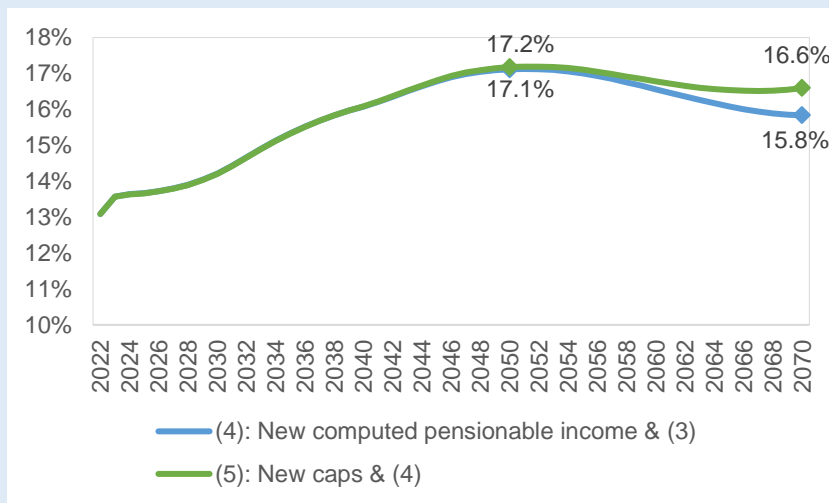
Source: Spanish General Directorate for Macroeconomic Analysis

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[34] In the counterfactual scenario it is assumed that they grow in line with the CPI.

Finally, new legislation entails higher growth rates for minimum and for non-earnings-related pension benefits. Specifically, the new rule establishes that by 2027 minimum pension benefits cannot be lower than the established poverty threshold. Also, non-earnings-related pensions benefits will follow a similar trend as the minimum old-age pensions benefit. Up to 2027 minimum pension benefits and non-earnings-related pension benefits will grow at a higher rate under the new legislation. These two measures result in an increase of 0.1 pp of public pension expenditure as a share of GDP in 2050 and in 2070.

**FIGURE 33** – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER DIFFERENT SCENARIOS

Source: Spanish General Directorate for Macroeconomic Analysis

In a nutshell, the measures adopted in 2021 and 2023 lead to a 3.3 pp of GDP increase in public pension expenditure in 2050 (Figure 34) and to a 5 pp increase in 2070. The main driving forces of this upward pressure on public pension expenditure are the new indexation rule based on the CPI and the abolition of the SF. The new bonus/malus scheme and the related increase on the effective retirement age compensate partially this increase. The rest of the adopted measures slightly increase public pension expenditure.

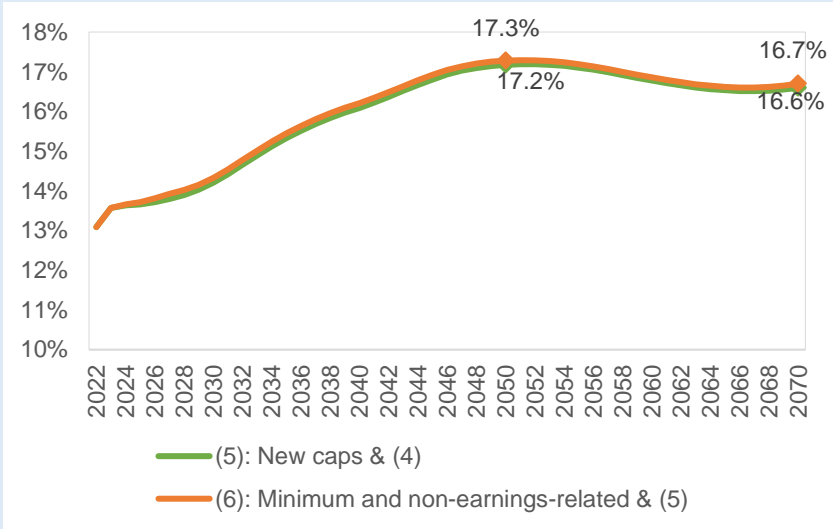**FIGURE 34** – PUBLIC PENSION EXPENDITURE (AS SHARE OF GDP) UNDER DIFFERENT SCENARIOS
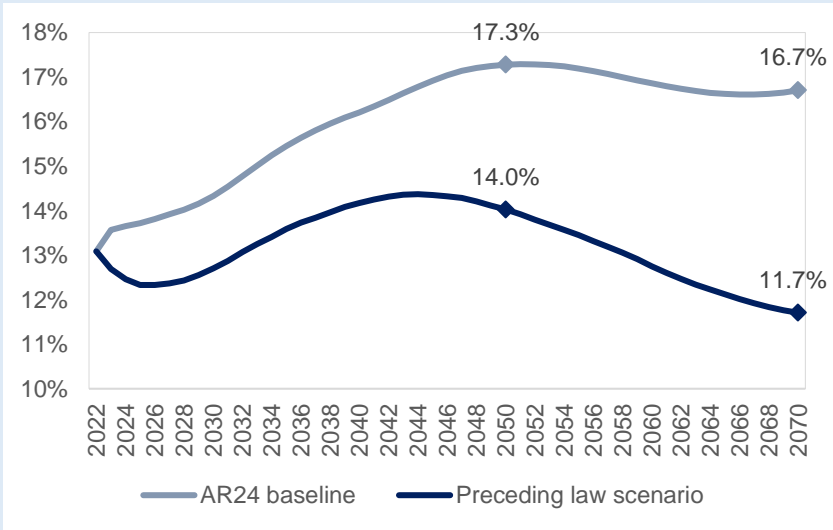
Source: Spanish General Directorate for Macroeconomic Analysis

The table below summarizes the estimated impact of each adopted measure during the projection period.

	2030	2040	2050	2060	2070
Preceding law scenario	**12.7%**	**14.2%**	**14.0%**	**12.7%**	**11.7%**
CPI indexation	2.1%	3.0%	3.4%	3.4%	3.2%
SF abolition	0.0%	0.4%	0.9%	1.3%	1.7%
Bonus/malus scheme	-0.7%	-1.7%	-1.4%	-1.1%	-1.0%
New computed pensionable income	0.0%	0.1%	0.2%	0.2%	0.2%
New caps	0.0%	0.0%	0.1%	0.2%	0.8%
Minimum and non-earnings-related	0.1%	0.1%	0.1%	0.1%	0.1%
AR24 baseline	**14.3%**	**16.2%**	**17.3%**	**16.9%**	**16.7%**

Source: Spanish General Directorate for Macroeconomic Analysis

4. Description of the pension projection model

4.1. Institutional context in which the projections are made

The projection model used in this edition of the Ageing Report, known as PeGaSo, has been developed by the Ministry of Economic Affairs and has been used in previous editions as well. This section of the country fiche describes its main features and its most recent methodological refinements.

4.2. Data description

The macroeconomic and demographic variables used in the projections are exogenous as agreed in the Ageing Working Group (AWG). They were provided by Eurostat and the European Commission.

Most data used to run the PeGaSo model were provided in 2023 by the Ministry of Social Security and Inclusion and refer to the base year 2022 and historical data. All data are categorized by type of pensions (old-age and early retirement, disability and survivors), by sex and age (as of December 31st of each year) and include details on the number of new registrations, withdrawals and the current stock of pensions, as well as their average pension benefit. The same information for *Clases Pasivas* pensions is provided by the mutual societies of this regime. Non-contributory pensions data comes from IMSERSO and also refer to the base year 2022.[35]

To be able to project income an anonymous microdata sample of Personal Income Tax of 2019 provided by the IEF (Fiscal Studies Institute) has been used. This data sample consists of the values declared in the statement for every concept to be filled in.

The projection methodology of each new registration for each period and its corresponding pension benefit follows the specific rules that apply for each pension type (see section 4.3). The number of new pensions is linked to the participation rates and exit rates provided by the European Commission's commonly agreed scenario.

Relevant historical data are also taken from an individual data set published by the Social Security, the *Muestra Continua de Vidas Laborales* (MCVL[36] by its Spanish acronym). MCVL is a set of individual anonymous microdata extracted from the registry of the Social Security containing data of a representative sample of the population about their working careers and pension benefits received, among others.

Finally, the number of pensioners withdrawals from the system is projected considering the potential exit causes from the system. Given that the main cause is mortality, the general projection applies age and gender specific mortality rates provided by Eurostat's population projections.

4.3. General description of the model(s) and calibration

PeGaSo is used to obtain expenditure and income projections. In what refers to expenditure projections, several modules are used to properly incorporate the particularities of each regime and type of pension. There are also ad-hoc programs outside PeGaSo which are used to develop inputs that feed into

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[35] Institute for the Elderly and Social Services (Instituto de Mayores y Servicios Sociales).

[36] https://www.seg-social.es/wps/portal/wss/internet/EstadisticasPresupuestosEstudios/Estadisticas/EST211

PeGaSo's modules. These ad-hoc programs have been developed because the modelling of some reforms require specific calibration. Figure 35 depicts the structure of the projection program.

FIGURE 35 – STRUCTURE OF THE PROJECTION PROGRAM
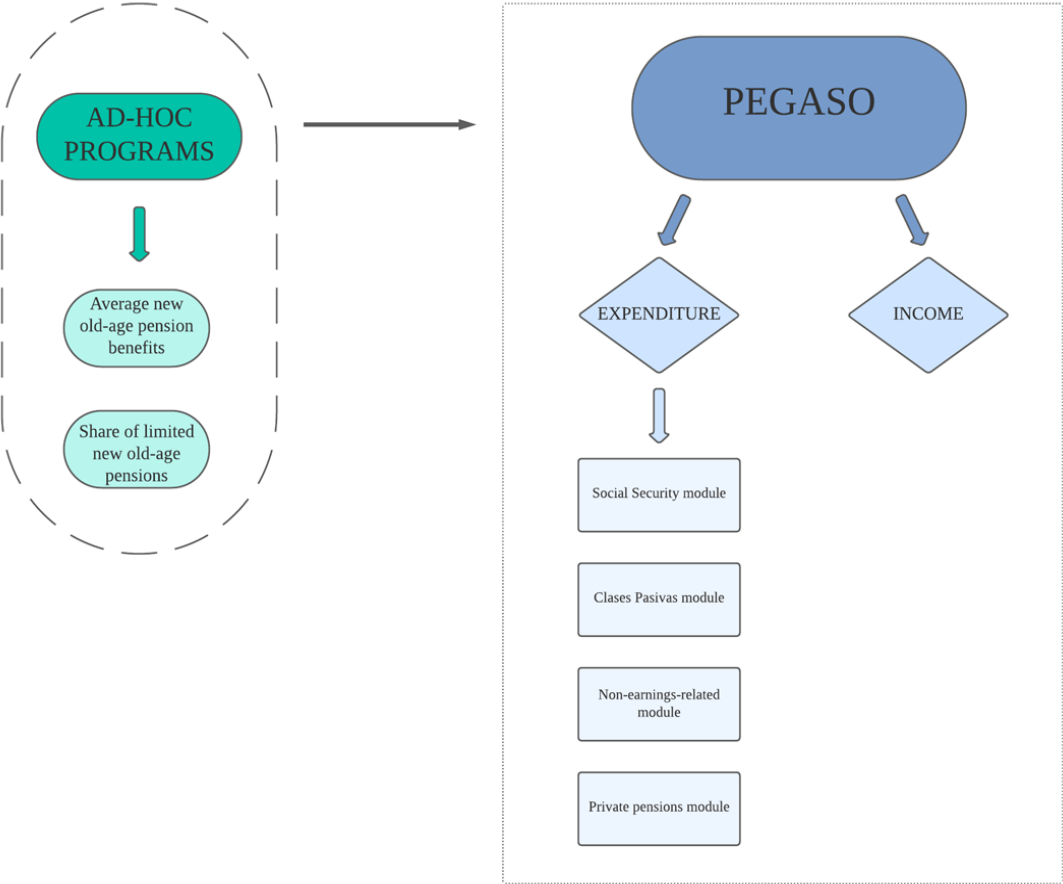
Source: Spanish General Directorate for Macroeconomic Analysis

4.3.1.   Ad-hoc specific programs

1. Program to assess the impact of reforms in average new old-age pension benefits.

The main inputs to project pension expenditure are the average pension benefit and the number of pensions. Thus, reforms that have an impact on average old age-pension benefits must be calibrated. To do so, the MCVL offers a representative sample of new retirees and provides useful information such as their age, sex, contribution bases and the length of their contribution profile among others. Therefore, it is possible to use this information to assess how new old-age pension benefits would change given any potential measure.

This ad-hoc program incorporates the effects of some measures from previous reforms with impact on average pension benefit and which are still in force, namely:

From 2011:

- *Extension of the statutory retirement age.* The statutory retirement age will gradually increase until 67 years in 2027 for those who have contributed less than 38 years and 6 months. If contributed more, retirement is possible at the age of 65. Since MCVL provides the length of the contribution profile of new retirees, it is possible to estimate their statutory retirement age as indicated by this law.

From 2013:

- *Changes in the accrual rate.* The number of contribution months to reach a 100% accrual rate on pensionable income were gradually increased from 426 in 2013 to 448 in 2027. The accrual rate starts at 50% when a pensioner has contributed for the minimum contributory period (15 years) and increases with every extra contribution month until it reaches 100% by the 448th. Since the MCVL provides the length of the contribution profile of new retirees, it is possible to estimate their accrual rate as indicated by this law.

Finally, measures adopted in the latest reform (2021-2023) with an impact on average new old-age pension benefits are also calibrated:

- *Implementation of a new incentives scheme aimed at increasing the effective retirement age.* A bonus/malus scheme is in place that affect pensioners retiring after or before their statutory retirement age. Penalty coefficients are now monthly determined instead of quarterly. For those whose pension benefit is capped by the maximum pension, penalty coefficients are directly applied to the maximum pension. To promote late retirements every worker retiring after the legal age is granted with a 4% bonus for each year of postponement, regardless of the number of years they have contributed to the system. These measures will affect new old-age pension benefits through three channels. First, new retirees will postpone their retirement decision. This shift on their behaviour entails longer contribution profiles and therefore higher accrual rates and pension benefits. To properly incorporate this effect, the ages of retirement provided by the MCVL are upwards revised according to the estimated increase of the effective retirement age caused by this new scheme. This estimate is obtained with the European Commission's commonly agreed scenario as explained in Box 2.2.A. Second, due to the postponement in the retirement decisions there will be less early retirements and more late retirements (extensive margin). At the same time, those still retiring early will do it at a greater age, and those already retiring after the legal age will do it even at a greater age (intensive margin). To assess this effect, pensioners have been categorized based on their retirement ages (obtained as previously indicated) and their statutory retirement ages (which are estimated based on the length of their contribution profiles provided by the MCVL). Namely, they are categorized as early new retirement, late new retirements or ordinary retirements based on the gap between their age of retirement and their statutory retirement age. Third, new penalties and bonus directly reduce or increase new old-age pension benefits. To incorporates these effects, new penalties and bonuses are applied in accordance with the current law. Specifically, new penalties are applied based on the gap between the age of retirement and the statutory retirement age and based on the length of the retiree's contribution profile, in accordance with the current law. Also, pension benefits of those categorized as late retirements are increased by a 4% for each complete year of retirement, in accordance with the current law.

- *Extension of the computed pensionable income.* As of 2044, the sum of the best 324 contribution bases in the last 348 months prior to retirement will be used to calculate the pensionable income. Until then, a gradual scheme is being applied in which new retirees can choose between the preceding and the current law. Since the MCVL provides information on all the contribution bases of new retirees, it is possible to calculate pensionable income in accordance with the current law.

- *Improvement on the integration of contribution gaps for all women and for those men who are eligible to receive gender gap complement.* Under the current law and as long as there is a gap of at least 5% between new old-age pension benefits for men and women, gaps in women's contribution profile occurring within the 60 most recent months prior to retirement are filled using 100% of the minimum contribution base. Gaps between the 61 and the 84 most recent months are filled with 80% of the minimum contribution base. Gaps farther in time are filled with 50% of the minimum contribution base, as with the general rule. This new rule also applies for those men who are eligible to receive the gender gap complement. Since the MCVL provides information on the gender of new retirees, and it also indicates the complements received by each retiree, it is possible to fill contribution gaps in accordance with the current law.

Figure 36 shows the formula used to calculate old-age pension benefits and how its components are affected by the aforementioned measures.

FIGURE 36 - FORMULA FOR OBTAINING OLD-AGE PENSION BENEFITS
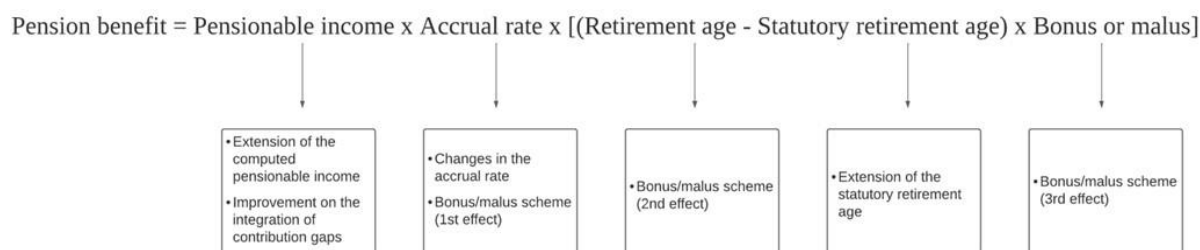
Source: Spanish General Directorate for Macroeconomic Analysis

2. <u>Program to project the share of old-age pension benefits limited by the maximum or minimum pension threshold.</u>

Spanish pensions are capped with a maximum pension benefit and limited by a minimum pension benefit. The share of maximum and minimum pensions is a key input of PeGaSo.

- Under new legislation, maximum contributory bases are now indexed like preexisting pension benefits to CPI. Additionally, from 2024 to 2050 1.2 additional percentage points will be added to the index.

- Under new legislation, maximum pensions will be indexed with the same general indexation rule as contributory pension benefit but from 2025 to 2050 an extra 0.115 percentage points each year will be added to the index. From 2051 to 2065 it will grow at a 20% in accumulated real terms (see Table 25).

Year	2051	2052	2053	2054	2055
Grow th rate (%)	3.2	3.6	4.1	4.8	5.5
Year	2056	2057	2058	2059	2060
Grow th rate (%)	6.4	7.4	8.5	9.8	11.2
Year	2061	2062	2063	2064	2065
Grow th rate (%)	12.7	14.3	16.1	18	20

Source: Spanish General Directorate for Macroeconomic Analysis

- Under new legislation, from 2027 onwards, the minimum old-age and widow(er) pension benefit for a pensioner with a dependent spouse cannot be lower than the stablished poverty threshold. To reach that goal by 2027, the revaluation of minimum pension benefits will be increased in 2024, 2025, 2026 in order to reduce the gap with the stablished poverty threshold by 20, 30 and 50%. In 2027, minimum pensions will need to increase as needed in order to eliminate the gap.

The program consists of three steps to assess the share of maximum and minimum pensions. First, contributions bases are projected using wages growth[37]. The MCVL provides information of all contribution bases (since 1980) of a sample of new retirees in 2022. To project future pensions, contributory bases of future pensioners are rescaled one year ahead based on wages growth. Figure 37 depicts the rationale of this methodology with an example for 2023. Minimum and maximum bases are also projected based on the new legislation. Second, projected contributory bases are limited by maximum and minimum bases. Finally, the proportion of new pension benefits in maximum or minimum thresholds is derived. This methodology is applied for each year of the projection period (2023-2070).

FIGURE 37– METHODOLOGY TO PROJECT THE SHARE OF LIMITED PENSIONS
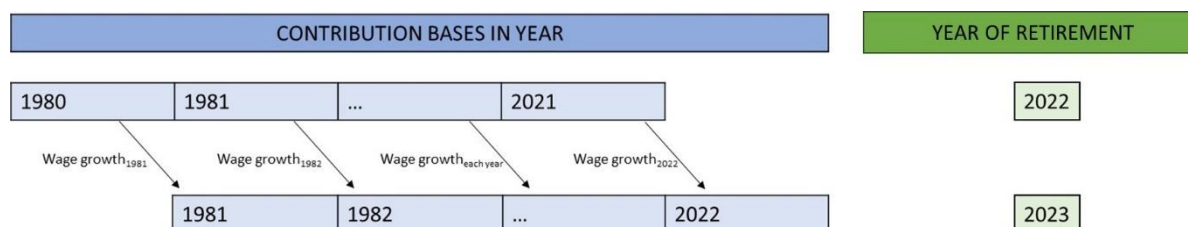
Source: Spanish General Directorate for Macroeconomic Analysis

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[37] Future wage growths are estimated based on the European Commission's commonly agreed scenario.

4.3.2. PeGaSo's expenditure projection modules

PeGaSo consists of four independent and deterministic modules:

Module 1. A module to project Social Security pensions (for private sector employees, self-employed, unemployed and the public sector employees of the central, regional and local administrations who did not join the *Clases Pasivas* regime). It includes old age and early retirement public pension expenditure, disability public pension expenditure and survivors' public pension expenditure (widows, orphans, relatives).

Module 2. A module to project public pension expenditure for public sector employees (civil servants) covered by the *Clases Pasivas* regime, which includes old age and early retirement pensions, disability pensions, survivors' pensions and war pensions.

Module 3. A module to project non-earnings-related pensions. This model is connected with the results of the two previous models.

Module 4. A module to project private pensions (occupational and individual voluntary schemes). This model is elaborated by the General Directorate of Insurance and Pension Funds.

1. Module 1: the Social Security module

The module simulates the net number of public earnings-related pensions for each category and every year, their average pension benefit, and the total pension expenditure per year. The basic formula *[1]* is decomposed by class of pension (k), sex (s), age (e) and year (t). There are five types of pensions: Retirement, Disability, Widowhood, Orphanage and other relatives. Expenditure is the sum of the product of the total number of pensions of each kind of pension ($TP_{k,s,e,t}$) and their average total pension benefit ($TB_{k,s,e,t}$). The ratio to GDP is calculated by dividing expenditure over GDP:

$$[1] \quad \frac{PensionExpenditure_t}{GDP_t} = \frac{\sum_{k=1}^{5}\sum_{s=1}^{2}\sum_{e=0}^{100} TP_{k,s,e,t}\, TB_{k,s,e,t}}{GDP_t}$$

The number of pensions (TP) on December 31st each year, per cohort age is calculated *[2]* by adding to the existing number of the previous year the new entrants (NP) from the same cohort and subtracting people withdrawn from the system (WP) of the same cohort (mortality affects existing pensions and new pensions). The starting point is the registered pensions of the Social Security.

$$[2] \quad TP_{k,s,e,t} = TP_{k,s,e-1,t-1} + NP_{k,s,e,t} - WP_{k,s,e,t}$$

The average pension benefit of new registrations (NB) is the central element of the projection and takes into account the legislation that applies for each type of pension as well as minimum (initially indexed to inflation and later indexed to productivity and inflation), maximum (indexed to inflation) within thresholds (indexed to productivity and inflation, *[3]*), *Seguro Obligatorio de Vejez e Invalidez* (SOVI), pensions and others.

$$[3] \quad NB_{s,e,t} = NB_{s,e,t-1} * (1 + prod_t + inf_t)$$

The average pension benefit of people withdrawing from the system (WB) is a weighted average of the existing pensions indexed to the CPI and new entrant's pensions *[4]*.

$$[4] \quad WB_{s,e,t} = \frac{(TP_{s,e-1,t-1} * TB_{s,e-1,t-1} * (1+inf_t) + NP_{s,e,t} * NB_{s,e,t})}{TP_{s,e-1,t-1} + NP_{s,e,t}}$$

The average total pension benefit (TB) is calculated as a weighted average of existing pensions indexed to the *CPI*, new pensions and deducting withdrawals of the year *[5]*.

$$[5] \quad TB_{s,e,t} = \frac{(TP_{s,e-1,t-1} * TB_{s,e-1,t-1} * (1+inf) + NP_{s,e,t} \ NB_{s,e,t} - WP_{s,e,t} * WB_{s,e,t})}{TP_{s,e-1,t-1} + NP_{s,e,t} - WP_{s,e,t}}$$

2. Module 2: *Clases Pasivas* module

It has the same structure than module 1 and incorporates the same basic expenditure formula. The main difference is that the system is closed to new entrants as of 1-1-2011. Therefore, the number of contributors decreases according to mortality and new pensions. The figures for new pensions are derived from a coefficient that relates new pensions in the base year to contributors in the previous year and previous age. This coefficient is assumed to remain constant, and it is applied to the remaining contributors each year to estimate new pensions.

3. Module 3: Non-earnings-related pensions module

The number of new old-age entrants equals the number of people at their retirement age that are not eligible to receive any earning-related pension, adjusted by a coefficient that takes into account that there are people not entitled to a means-tested non-contributory pension (high income or wealthy) and people who do not claim their right to a pension. Both the average pension benefit of new entrants and the average pension benefit of existing pensions are indexed to wages.

4. Module 4: Private pension schemes module

Eurostat demographic and AWG macroeconomic assumptions have been incorporated in the private pensions model elaborated by the Ministry of Economic Affairs (Directorate General for Insurance and Pension Funds).

The model runs separate projections for individual and occupational pension plans and collective pension insurance plans. The nominal interest rate assumed throughout the projection horizon is 4%.

4.3.3.   PeGaSo's income projection module

The Income projection module of the model has been refined. It is now calibrated with microdata from the Tax Agency to simulate future earnings that will be taxed as contributions to the Social Security Regime.

Microdata of Tax Income returns comes from the Tax Agency AEAT[38]. Other income data sources come from the Social Security Financial Report[39].

The methodology projects individual income into the future based on wages growth assumptions[40]. Contributory bases are then derived based on projected maximum and minimum bases, in accordance with the current law. Revenues are calculated by multiplying contributory bases by contribution rates as well as additional levies introduced by the new law such as the Intergenerational Equity Mechanism (MEI)[41] and the solidarity levy[42]. An additional revenue stream will also result from the additional increase of the maximum contributory bases. Finally, other income stemming from additional sources such as transfers from the central government are projected based on nominal GDP growth assumptions.

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[38] Agencia Tributaria.

[39] Informe Económico y Financiero de la Seguridad Social 2023.

[40] Changes in hours worked per employee (growth rate) + Hourly labour productivity (growth rate) + CPI.

[41] The MEI establishes an additional contribution that will progressively reach 1.2% between 2023 and 2029: 1% to be paid by the employer and 0.2% by the worker. From 2030 to 2050 this additional contribution rate will remain constant. Revenues will fund the Social Security Fund Reserve. As of 2033, the accumulated Reserve Fund's resources will be used to partially fund contributory pensions.

[42] The Solidarity levy (SL) consists of an additional contribution for income above the maximum contributory base. For income over the maximum contribution base, an additional 5.50% will apply for the first 10% of the excess income, 6% will apply for income between 10% and 50% of the excess income and 7% will apply for the remaining excess income. This measure also has a transition period from 2025 to 2045.

Methodological annex

Economy-wide average wage at retirement

The average wage at retirement age and the general average wage are very similar in Spain. Therefore, as in previous ARs, the general average gross wage provided by the European Commission has been used in the model as the average wage at retirement.

TABLE A1 – ECONOMY-WIDE AVERAGE WAGE AT RETIREMENT (1000 EUR)

	2022	2030	2040	2050	2060	2070
Economy-wide average gross wage at retirement	27.2	33.8	46.4	67.7	96.9	135.2
Economy-wide average gross wage	27.2	33.8	46.4	67.7	96.9	135.2

Source: European Commission, EPC.

Pensioners vs pensions

In the Spanish pension system, pensioners can receive more than one pension at the same time. Thus, the number of pensioners and pensions is not the same. PeGaSo projects the number of pensions. To estimate the number of pensioners, the starting point is the ratio between the number of pensioners over the number of pensions in the base year. Then, the ratio is assumed to keep constant over time and it is used to infer the number of pensioners based on the number of pensions estimated with PeGaSo for the projection period. This methodology applies to the Social Security and to the *Clases Pasivas* regime[43] but not to non-contributory pensioners, since these pensioners cannot receive more than one non-contributory pension.

It is important to highlight that pensioners coefficients for widowhood are much lower than others because in Spain when a pensioner receives more than one pension, he is only accounted as pensioner of the main pension he obtains. In particular, main pensions are those directly obtained by pensioners (old-age and disability) in opposition to derivative pensions (survivors). Consequently, there are many widowers who also receive an old age pension that are not accounted for as widowers.

Disability pensioners

The evolution of disability pension expenditure depends on the evolution of its average pension benefit and the number of pensions.

New disability pension benefits evolve in line with wages[44]. The current stock of pension benefits is indexed to CPI in accordance with the current law. Average pension benefits of withdrawals from the system are equivalent to the average pension benefit of the previous year.

The number of disability pensions is calculated adding to the stock of the previous year at the previous cohort age the difference between the number of new pensions and the withdrawals.

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[43] For *Clases Pasivas* regime coefficients from the Social Security regime are used. There is no administrative data available to calculate these coefficients for *Clases Pasivas,* but it is assumed that they must be very similar to those of the Social Security regime.

[44] This assumption is realistic since disability pension benefits are related to contributions and contributions are in turn related to wages.

To calculate new disability pensions, equation *[6]* shows the calculation of the probability to become disabled. The probability equals the number of new disability pensions for each age in the base year over the total working population in that same year. New disability pensions cannot happen after 64 years old, since disability pensions as of 65 years old are statistically computed as old age pensions in the Spanish system. Therefore, there are no new disability pensions over 64 years of age. For the whole projection horizon, the probability is kept constant and applied to the working population *[7]*.

$$[6] \qquad DPr^e = \frac{new\ disabilty\ pension^e_{2022}}{working\ population^e_{2022}}$$

$$[7] \qquad NDP^e_t = DPr^e * working\ poulation^e_t$$

To project withdrawals it is assumed that mortality is higher among disability pensioners than the average population. To assess this extra mortality among the disabled population, the actual mortality for this group in the base year is calculated as withdrawals in the base year for each age over the number of disability pensions the previous years for cohorts one-year younger *[8]*. If the mortality for a cohort is bigger that the average mortality in the scenario, the difference between the mortality of the disabled and the average mortality in the base year *[9]* is added to the average mortality for the rest of the years *[10]*. The number of withdrawals equals to the number of disability pensions in t-1 for age e-1 times the mortality calculated for disability pensioners *[11]*.

$$[8] \qquad MortD^e_{2022} = \frac{WDP^e_{2022}}{NumDP^{e-1}_{2021}}$$

$$[9] \qquad Ri^{\,e} = MortD^e_{2022} - AvMort^e_{2022}$$

$$[10] \qquad MortD^e_t = AvMort^e_t + Ri^{\,e}$$

$$[11] \qquad WDP^e_t = MortD^e_t * NumDP^{e-1}_{t-1}$$

TABLE A2 – DISABILITY RATES BY AGE GROUPS (%)

	2022	2030	2040	2050	2060	2070
Age group -54	2.4	2.2	1.9	2.1	2.2	2.1
Age group 55-59	10.4	9.5	9.4	9.1	9.4	9.7
Age group 60-64	22.5	18.7	17.6	17.3	17.6	18.1
Age group 65-69	-	-	-	-	-	-
Age group 70-74	-	-	-	-	-	-
Age group 75+	-	-	-	-	-	-

Source: Spanish General Directorate for Macroeconomic Analysis

Survivors' pensions

In the Spanish pension system, there are 3 types of earnings-related survivor pensions: widows, orphans and *favor de familiares*, which is given to those relatives economically dependent from the deceased contributor that have not the right to neither of the other two survivor pension benefits.

<u>Widowhood:</u>

New widowhood pensions *[13]* are estimated by multiplying deaths of men (women) two years older (younger) by the ratio of new pensions (NW) for each sex over the deceased population (D) of the other sex in the base year [45] *[12]*.

$$[12] \qquad WC_{t,F}^e = \frac{NW_{2022,F}^g}{D_{2022,M}^{g+2}} \text{ [46]} \qquad WC_{t,M}^e = \frac{NW_{2022,M}^g}{D_{2022,F}^{g-2}}$$

$$[13] \qquad NW_{t,F}^e = WC_{t,F}^e * D_{t,M}^{e+2} \qquad NW_{t,M}^e = WC_{t,M}^e * D_{t,F}^{e-2}$$

New pension benefits are estimated as follows. For women under 63 years old and men under 67 years old new pension benefits evolve in line with salaries, since it is assumed that the deceased was of working age. For older ages, pension benefits evolve in line with the old-age pension benefit of withdrawals from the system, assuming that the deceased was an old-age pensioner.

Withdrawals from widowhood pensions are projected using mortality rates from the demographic scenario.

<u>Orphanage:</u>

Orphanage pensions follows a similar approach than widowhood pensions. There are no new orphanage pensions over 64 years of age. For the rest of cohorts, new orphanage pensions *[15]* are calculated by multiplying the expected deaths of those aged 35 years and older by the ratio between new orphanage pensions (NO) for every single age and by sex over the total number of deaths (for both, male and female) of those age 35 years and older in the base year *[14]*.

$$[14] \qquad OC^e = \frac{NO_{2022}^e}{D_{2022,M+F}^{e+35}}$$

$$[15] \qquad NO_t^e = OC^e * D_{t,M+F}^{e+35}$$

New pension benefits are indexed to wages growth assuming that the parent was a contributory worker. Existing pensions are indexed to CPI and limited by the maximum and minimum pension benefit thresholds.

Withdrawals from orphanage usually happen because the recipient reaches a certain age or because he starts receiving an income of his own. Withdrawals [17] are calculated by multiplying the number of withdrawals (OW) for each age and sex in the base year over the total number of orphanage pensions (OP) of the same sex in the previous year and at one year younger *[16]* by the orphanage pensions stock.

$$[16] \qquad OWC^e = \frac{OW_{2022}^e}{OP_{2021}^{e-1}}$$

$$[17] \qquad OW_t^e = OWC^e * OP_t^e$$

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[45] The average age difference between spouses equals the average age for men and women at marriage. In Spain the average age for men at marriage is 2 years older than women's average age at marriage.

[46] Where *e* is the age and *g* is the group of five years to which age *e* belongs. *M* y for male and *F* for female.

Favor de familiares:

New pensions *[19]* are projected by multiplying the sum of total deaths in any given year by the ratio of new pensions for each single age and sex in the base year over the sum of total deaths in the base year *[18]*.

$$[18] \quad FFC^e = \frac{NFF^e_{2022}}{D_{2022,F+M}}$$

$$[19] \quad NFF^e_t = FFC^e * D_{t,F+M}$$

Existing pension benefits are indexed to CPI and limited by a maximum and a minimum pension threshold. New pensions benefits are indexed to wages growth.

Withdrawals *[21]* are defined as the number of withdrawals (FFW) for each age and sex in that base year over the total number of *favor de familiares* pensions (FFP) of the same sex the previous year at one-year younger age *[20]* and multiplying that ratio by the *favor de familiares* pensions stock.

$$[20] \quad FFWC^e = \frac{FFW^e_{2022}}{FFP^{e-1}_{2021}}$$

$$[21] \quad FFW^e_t = FFWC^e * FFP^e_t$$

Non-earnings-related minimum pension

A non-earning related minimum pension is a social welfare instrument. It is managed by the IMSERSO[47]. This type of pension is intended for people who have no right to an earnings-related pension.

The old-age non-earnings-related pensions take up rate is calculated as the ratio of base year's new pensions (NNC) over inactive population (IP) at 65 by sex *[22]*. This ratio is estimated for both, men and women.

$$[22] \quad NCCoef^e_{2022} = \frac{NCC^e_{2022}}{IP^e_{2022}}$$

Then, the number of new non-earnings-related pensions for each age and sex equals the take up rate times the inactive population in the same year for the same sex and age.

Withdrawals are calculated by applying mortality rates to the non-earnings-related pensions stock.

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[47] Instituto de Mayores y Servicios Sociales (Institute for the Elderly and Social Services), Ministry for Social Rights and 2030 Agenda.

Alternative pension spending disaggregation

Table A3 and Table 12 are similar but the former provides a disaggregation of the change in pension expenditure based on the number of pensioners as compared to the number of pensions in Table 12.

TABLE A3 – FACTORS BEHIND THE CHANGE IN PUBLIC PENSION EXPENDITURE BETWEEN 2022 AND 2070 (PPS OF GDP) – PENSIONERS

	2022-30	2030-40	2040-50	2050-60	2060-70	2022-70
Public pensions to GDP	1.2	1.9	1.1	-0.4	-0.2	3.6
Dependency ratio effect	2.6	4.4	3.4	0.0	0.1	10.5
Coverage ratio effect*	-1.1	-0.5	0.4	0.8	0.0	-0.3
Coverage ratio old-age	-0.9	0.3	1.1	0.8	0.0	1.2
Coverage ratio early-age	-0.7	0.3	-0.6	-0.7	0.4	-1.2
Cohort effect	-1.3	-4.7	-4.0	1.6	0.2	-8.1
Benefit ratio effect	0.7	-0.9	-2.0	-1.4	-0.2	-3.9
Labour market effect	-0.7	-0.8	-0.5	0.2	-0.1	-2.0
Employment ratio effect	-0.5	-0.5	-0.5	0.0	0.1	-1.4
Labour intensity effect	0.0	0.0	0.0	0.0	0.0	0.0
Career shift effect	-0.3	-0.4	0.0	0.1	-0.1	-0.7
Residual	-0.2	-0.3	-0.2	0.0	0.0	-0.7

Source: European Commission, EPC.

Annexes

Extension of the computed pensionable income. Transitional scheme

Real Decreto-ley 2-2023 incorporates an extension of the computed pensionable income, which starts in 2026 and deploys gradually until 2037, as follows:

TABLE A4– COMPUTED PENSIONABLE INCOME RULE

YEAR	COMPUTED PENSIONABLE INCOME		
	Best (months)	In last (months)	Divided by
2026	302	304	352.33
2027	304	308	354.67
2028	306	312	357.00
2029	308	316	359.33
2030	310	320	361.67
2031	312	324	364.00
2032	314	328	366.33
2033	316	332	368.67
2034	318	336	371.00
2035	320	340	373.33
2036	322	344	375.67
2037	324	348	378.00

Source: Spanish General Directorate for Macroeconomic Analysis

Notwithstanding the foregoing, an additional transitional period is applied from 2026 to 2043 as follows:

- The most favourable computed pensionable income rule between the preceding and the current law is applied to new retirees between 2026 and 2040.

- In 2041, the sum of the last 306 contribution bases divided by 357 will be used to calculate the computed pensionable income if more favourable than the current law.

- In 2042, the sum of the last 312 contribution bases divided by 364 will be used to calculate the computed pensionable income if more favourable than the current law.

- In 2043, the sum of the last 318 contribution bases divided by 371 will be used to calculate the computed pensionable income if more favourable than the current law.

Intergenerational Equity Mechanism

The Intergenerational Equity Mechanism (MEI by its Spanish acronym) is an additional contribution rate implemented in 2023 and which will be in force until 2050. This additional contribution rates affects both, employers and employees, and it will grow gradually as follows:

TABLE A5– INTERGENERATIONAL EQUITY MECHANISM CONTRIBUTION RATE (IN %)

YEAR	MEI (contribution rate, in %)	
	Employer	Employee
2023	0.50	0.10
2024	0.58	0.12
2025	0.67	0.13
2026	0.75	0.15
2027	0.83	0.17
2028	0.92	0.18
From 2029 to 2050	1.00	0.20

Source: Spanish General Directorate for Macroeconomic Analysis

Resources collected by the MEI will be used to fund the Social Security system's Reserve Fund. As of 2033, the accumulated Reserve Fund's resources will be used to partially fund earnings-related pensions. It will be annually indicated in the budget law the disbursement to be made be the Social Security's Reserve Fund. The annual disbursement cannot exceed the maximum threshold as indicated in Table A6.

TABLE A6– MAXIMUM ANNUAL DISBURSEMENT (IN % OF GDP)

YEAR	Maximum disbursement
2033	0.10%
2034	0.12%
2035	0.15%
2036	0.17%
2037	0.19%
2038	0.22%
2039	0.25%
2040	0.28%
2041	0.46%
2042	0.50%
2043	0.54%
2044	0.77%
2045	0.82%
2046	0.87%
2047	0.91%
2048	0.86%
2049	0.84%
2050	0.82%
2051	0.53%
2052	0.51%
2053	0.50%

Source: Spanish General Directorate for Macroeconomic Analysis