Economic Policy Committee - Ageing Working Group

2024 Ageing Report

France - Country Fiche

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Introduction

The present country fiche for France 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 French Treasury from the Ministry of Economy and Finance. The pension projections presented in this fiche incorporate the macroeconomic assumptions and methodologies agreed within the *Ageing Working Group* of the *Economic Policy Committee*. 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 1 December 2023.

Section 1 provides a general overview of the pension system in France. 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]

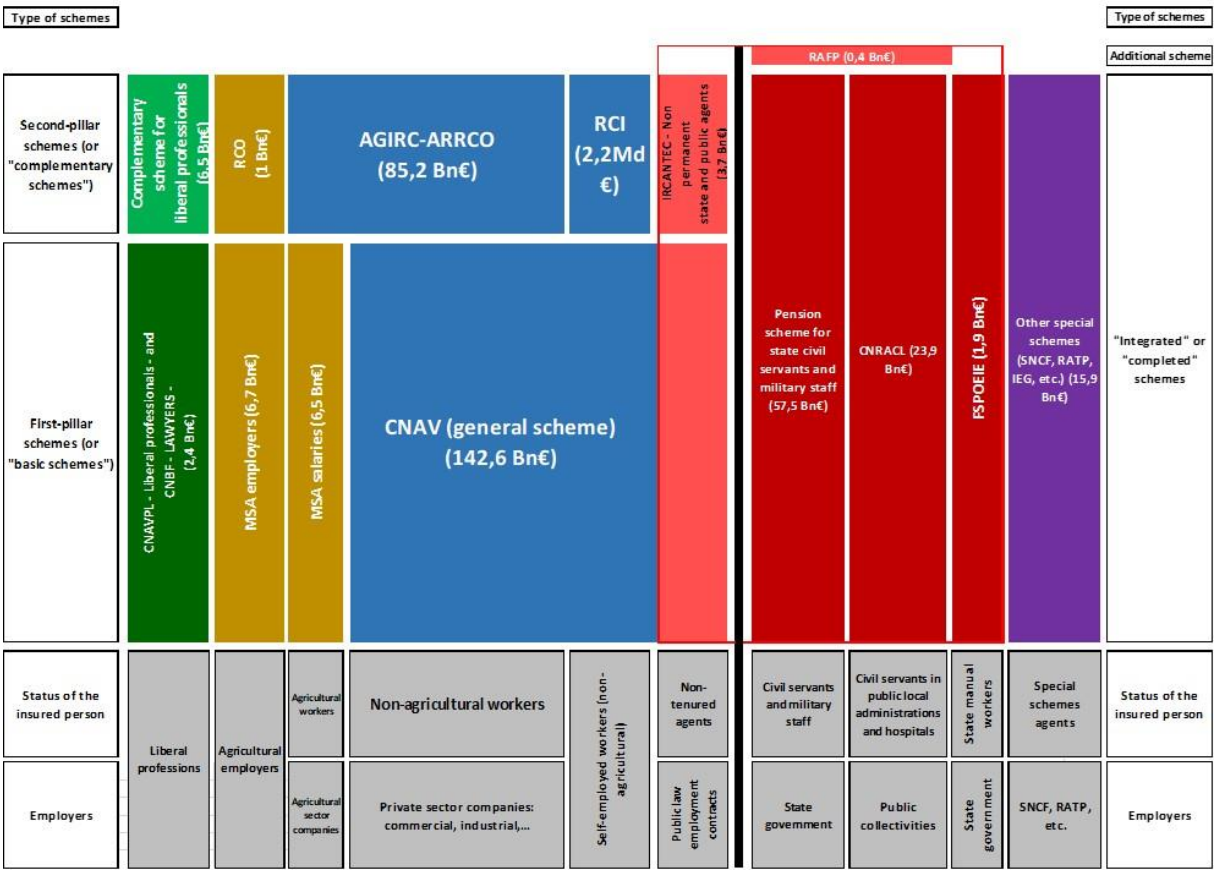
1.1. Description of the pension system

- ***A system made of different schemes for old-age and survivor pensions***

The French pension system for old-age and survivor pensions is essentially a pay-as-you-go public system financed by contributions from both workers and employers. The description of the pension system and the projections are based on the legislation in force in December 2023.

The French pension system is made of several first and second-pillar schemes depending on the professional sector or occupational status. The first-pillar scheme for private sector employees (*Caisse nationale d'assurance vieillesse* - CNAV) is the largest one. Each scheme has its own rules. All workers are affiliated, according to their profession, to a first-pillar scheme as well as a second-pillar scheme (both are mandatory). They can belong to several first-pillar schemes during their career: they then receive several first-pillar pensions at retirement.

FIGURE 1 – OUTLINE OF THE FRENCH PENSION SYSTEM



Note: For acronyms, please refer to the glossary in annex F.
*Before 2020, self-employed workers (artisans and retailers) were affiliated to a specific regime (SSI – *Sécurité sociale des indépendants*). In 2020, the SSI regime were merged into the CNAV regime.

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

In 2022, total gross expenditure on old-age and survivor pensions amounted to 356 Bn€ (13.5% of GDP; see Figure 1). The highest spending was for the general scheme (143 Bn€), followed by the second-pillar AGIRC-ARRCO scheme (85 Bn€).

Special Schemes

Within the French pension system, several special pension schemes exist. They can be divided into three groups:

- The scheme for State public servants (civil and military servants);
- The regime for public servants working in public local administrations and hospitals;
- Other schemes grouped around a specific profession or company.

The main special schemes include (see Table 1 for details in the number of contributors and pensions in 2022):

- The scheme for state civil servants, magistrates and military personnel covered by the Civil and Military Retirement Pensions Code;
- The regime for public servants employed in public local administrations and hospitals;
- The Société Nationale des Chemins de Fer (SNCF)'s scheme for railway workers;
- The scheme for manual workers in state-owned industrial companies (FSPOEIE);
- The scheme for clerks and notary employees with the Pension and Welfare Fund for Clerks and Notary Employees;
- The Régie Autonome des Transports Parisiens (RATP, Parisian state-owned public transportation)'s scheme with the RATP staff pension fund;
- The regime for sailors with the National Establishment for the Invalids of the Navy;
- The Électricité de France-Gaz de France (EDF-GDF, Electrical and Gas Industries) scheme with the National Fund for Electrical and Gas Industries which covers workers in electrical and gas industries;
- The Cult Plan with the Old Age and Illness Insurance Fund for Religious Leaders;
- The Senate's parliamentary system with the Senate's autonomous social security fund, which has not been aligned with the civil service system;
- The parliamentary regime of the National Assembly with the Social Security Fund of the National Assembly, aligned since January 2018 with the Civil Service regime;
- The regime of the French Comedy;
- The regime of the Autonomous Port of Strasbourg;
- The regime for workers in the Banque de France.

Following the 2023 pension reform (see Section 1.2 for a description), several special schemes (RATP, SNCF, EDF-GDF, Clerks and Notary Employees, Banque de France) will be extinct. Only new hirings will be concerned by the measure and be affiliated to the general scheme for private sector employees.

TABLE 1 – NUMBER OF CONTRIBUTORS AND PENSIONS IN SPECIAL SCHEMES IN 2022

Special schemes	Contributors	Pensions
Civil and military servants	1 945 876	2 510 599
Public local administrations and hospitals	2 194 044	1 538 928
State-owned industrial company workers	18 435	93 585
Electricity and gas industries	135 513	179 491
SNCF	117 091	238 041
RATP	41 270	51 929
Clerks and Notary Employees	65 997	79 964
Seamen's	29 059	103 599
Banque de France	7 457	17 660
The mining regime	916	199 824
Paris National Opera	1 859	1 877
French Comedy	347	436

Pensions include earnings-related old-age pensions and survivor pensions.
Source: French Treasury's calculations based on data from the Budget Law for 2024.

Retirement age

Rules for retirement include a legal minimum retirement age[2] and incentives to postpone retirement.

- People can retire when they reach the earliest retirement age (62 up to the 1960 generation, 64 for generations born in 1968 and after), with a penalty if they do not meet the required contribution period condition (43 years from the 1965 generation onward).
- A full-rate pension is granted provided the required contribution period is met or if retirement occurs at the statutory retirement age (also called full-pension age, 65 up to the 1951 generation, 67 for cohorts born in 1955 and after). People allowed to retire with a full pension (as they meet the contributory period conditions above the earliest retirement age) and who decide to postpone retirement will receive a bonus on their pension proportional to the number of extra years worked.

More details on the age parameters by cohorts can be found in Annex C and D.

Under certain circumstances, people can retire before the legal minimum retirement age with no penalty:

- The most important case in terms of size, known as the "long-career scheme", is dedicated to people who validated 4 or 5 quarters before the age of 21: they can retire at 58 at the earliest (hence 6 years before the legal minimum retirement age for the cohorts born in 1968 and after) provided they have contributed long enough (see Annex E for more details). In 2022, nearly 20% of the new old-age retirees benefited from the long-career arrangement and retired before the legal retirement age of 62.

[2] Rules may differ from the general situation in certain schemes like, for instance, the second-pillar scheme for independent workers.

- In the public sector, for some special branches among "active service" (policemen, nurses, etc.), the minimum retirement age is 57 years.[3] In some special schemes, the minimum retirement age is also lower than in the general case under certain conditions.[4]

There is no gender difference in the eligibility requirements.

TABLE 2 – QUALIFYING CONDITIONS FOR RETIREMENT

			2022	2030	2040	2050	2060	2070
Qualifying condition for retiring with a full pension	Statutory retirement age - men		67	67	67	67	67	67
	Statutory retirement age - women		67	67	67	67	67	67
	Minimum requirements	Contributory period - men	42	43	43	43	43	43
		Retirement age - men	62	63,6	64	64	64	64
		Contributory period - women	42	43	43	43	43	43
		Retirement age - women	62	63,6	64	64	64	64
Qualifying condition for retirement without a full pension	Early retirement age - men		62	63,6	64	64	64	64
	Early retirement age - women		62	63,6	64	64	64	64
	Penalty in case of earliest retirement age*		-	-	-	-	-	-
	Bonus in case of late retirement **		-	-	-	-	-	-
	Minimum contributory period (in years) - men ***		0.25	0.25	0.25	0.25	0.25	0.25
	Minimum contributory period (in years) - women		0.25	0.25	0.25	0.25	0.25	0.25
	Minimum residence period - men ***		-	-	-	-	-	-
	Minimum residence period - women		-	-	-	-	-	-

* 1,25% by missing quarter is applied if the contributory period condition is not met and if retirement occurs the statutory retirement age (67).
** A bonus of 1,25% is applied for each extra quarter above the early retirement age.
*** 0.25 means 3 months.
**** There is no residence condition, except for ASPA (the non-contributory minimum income guaranteed for the 65+), whose beneficiaries have to live in France for at least 9 months in the corresponding year.
Source: French Treasury based on legislation.

Benefit fomula

a. ***Old-age pension***

Rules for computing old age earnings-related benefits differ between schemes. In what follows, only the formula used to compute the two components of the pension in the private sector (first-pillar pension from the CNAV and second-pillar pension from the AGIRC-ARRCO) and in the public sector will be described.

➢ *First-pillar private sector pensions (CNAV and aligned schemes)*

In the first-pilar private sector (CNAV) and the aligned schemes (*Mutualité Sociale Agricole* - MSA for workers in the farming sector), the pension *P* is calculated according to the following formula:

$$P = ref.wage \times Min\left(1, \frac{D}{T}\right) \times t$$

[3] Since the 2014 reform, the minimum retirement age for "active service" is increased from 55 for cohorts born in 1956 and before, to 57 for cohorts born in 1960 and after. Following the 2023 reform, the minimum age will increase from 57 for the cohort born in 1966 to 59 for the cohorts born in 1973 and after.
[4] For instance, in the special scheme dedicated to electrical and gas industries, retirement is possible at 57 for the cohort born in 1967 provided certain career conditions are met.

Three factors enter that formula:

- The *reference wage* is the average gross wage over the 25 best years (up to the Social Security ceiling, € 3,666 per month in 2023), with past earnings valorised in line with consumer price inflation.
- The *coefficient of proratisation Min (1,D/T)* with *D* being *the contributory period*, i.e. the number of years validated by the insured and *T*, the *reference contributory period*. In other words, the pension is reduced in due proportion whenever $D < T$. For people born in 1959 (who are 63 in 2022), *T* equals 41.75 years. This value will increase up to 43 years for people born in 1965 and after.
- The *pension rate t*. The standard rate, also called "full rate", is 50%.

Hence, for people with a full career (D=T), the pension is equal to 50% of the average over the best 25 years.

One important feature of the private sector first-pillar scheme is the rule for acquiring quarters: in any given calendar year, one quarter is acquired as soon as the total cumulated earnings reaches 150 times the minimum hourly wage, and one can validate at most four quarters per year. Hence, it is possible to validate four quarters during one single quarter of contribution, provided earnings exceed some level.

In order to foster older workers participation in the labour market, either a penalty or a bonus can be applied under certain conditions:

- A penalty is applied to the old-age benefit if the contributory period is shorter than the reference period ($D < T$) and if the pension is withdrawn before the full-pension age (67 from the 1955 generation onward). The deduction is then calculated as Min [Full pension age - Age, (T-D)] multiplied by the penalty rate (1.25% per missing quarter from the 1953 cohort onward). Hence, the penalty is 5% for each missing year and it cannot exceed 15% for cohorts born in 1968 and after for which the minimum retirement age is 64.
- Conversely, the pension is augmented by a premium for individuals who continue working above the minimum retirement age although they have met the conditions for a full pension. The premium is calculated as Min [Age - Minimum retirement age, (D-T)] multiplied by the premium rate (1.25% for each quarter beyond the required contributory period). The new pension *P'* is given by:

$$P' = P \times (1 + 1.25\% \times \text{number of extra quarters worked})$$

There exists a contributory minimum pension (called *minimum contributif*) for individuals who qualify for a full pension (either because they retire at 67 or have contributed long enough for being granted a full pension before the age of 67) but has earned low wages. The minimum amounts to 8,509.6 EUR per year in September 2023 (10,170.9 EUR for people with at least 30 years of contributions). Following the 2023 reform, the first payment of the minimum pension following retirement is indexed to the minimum wage while following payments are indexed to prices. The minimum pension is served in proportion of the career length, which means that the maximum amount of the minimum (8,509.6 EUR per year in September 2023) is perceived only for a full career. Besides, for people perceiving the minimum pension, the total amount of the old-age benefit (including the minimum pension as well as the second-pillar pension benefit) cannot exceed some threshold (equal to 1,352.2 EUR per month in May 2023). In 2022, nearly 32% of the new retirees in the general scheme were potentially eligible to the minimum pension.

➢ *Second-pillar pension (AGIRC-ARRCO for all private sector workers)*

The second-pillar scheme for private sector employees (AGIRC-ARRCO) is a pay-as-you-go point system scheme that serves defined-contribution benefits. Contributors acquire each year a certain

number of points through their own contributions and those of their employer. A discount factor of 1/1.27 applies to the contributions, meaning that some fraction of the contributions does not provide pension rights. The number of points acquired in year *t* is then equal to

Number of points acquired in year t = (contributions in t/1.27)/Purchase price of a point at t

where the purchase price of the point depends on the year considered. In 2023, it amounted to € 17.43.

When one retires, the total number of points accumulated throughout the career is converted into a pension benefit depending on the contributor's age, the contribution length and the current point value. The second-pillar pension is then calculated as follows:

Pension = Total number of points acquired × Value of a point × Shortfall coefficient

"Full" second-pillar pension is granted only to those who qualify for a full pension in the first-pillar scheme. In case one retires before fulfilling the requirements for a full pension in the first-pillar scheme, the value of the point is adjusted downwards by means of a "shortfall coefficient". The penalty is 1% for each missing quarter until the 12th, then 1.25% for each missing quarter between the 13th and the 20th. For example, pensioners with 4, 12 or 20 missing quarters will see their pension pro-rated by 0.96, 0.88 or 0.78 respectively.

- *Pensions in public sector schemes (fonction publique d'État - FPE and caisse nationale de retraite des agents des collectivités locales - CNRACL)*

The calculation of the first-pillar pension for public sector workers is very similar to the general private scheme:

$$P = ref.wage \times Min\left(1, \frac{D}{T}\right) \times t$$

The parameters differ from those of the general scheme in two essential aspects:

- The reference wage taken into account is the wage received in the last 6 months (excluding bonuses and other emoluments) before retirement, as opposed to the average of the best 25 years' wages (including bonuses) in the private sector.
- The full-pension rate *t* is 75%. The 2003 reform introduced also a penalty scheme and a premium rate, similar to the ones existing for private sector employees.

As in the private sector first-pillar scheme, the duration *T* taken into account in the *pro rata* coefficient is 41.75 years for people born in 1959 (aged 62 in 2021) and will increase up to 43 years for people born in 1965 and after.

Unlike what prevails in the general scheme for private sector employees, quarters are acquired on the basis of the effective period of work and not on earnings. Hence, a validation of four quarters in the public sector scheme requires working throughout the whole year.

Unlike private sector employees, public sector employees did not receive second-pillar pensions until recently. This is why their first-pillar pension full-rate is higher (75% versus 50% in the private sector). A complementary pension scheme (*Retraite additionnelle de la fonction publique* - RAFP) was introduced in 2005 following the 2003 reform. It is a point system whose contributions are only based on bonuses, within the limit of 20% of total wage. This scheme provides pensions which are much lower than those of the private sector second-pillar scheme AGIRC-ARRCO.

For pensioners who meet the requirements for a full pension, an earnings-related minimum pension is guaranteed (called *minimum garanti*). In 2023, its value was € 15,099.84 per year (€ 1,258.32 monthly) for a 40-year-long career.

*b. **Survivor pension***

The surviving spouse's allowances include (i) the survivor's pension (*pension de réversion*), which corresponds to a fraction of the pension the deceased spouse received (or could have received) and which is paid to the surviving spouse or ex-spouse and (ii) the widowhood allowance (*allocation de veuvage*), which is paid to the surviving spouses depending on their income if they do not meet the conditions of age in order to benefit from a survivor's pension. The survivor's pension is granted even if the deceased spouse died before retirement.

- *First-pillar private sector survivor pension (CNAV and aligned schemes)*

To benefit from a survivor pension, the surviving spouse or ex-spouse:

- must have been married to the deceased beneficiary (the 'Pacs' civil partnership and cohabitation do not entitle the partner to the survivor's pension);
- must be at least 55 years old, this age being reduced in certain cases (death or disappearance before 2009);

In the first-pillar private sector scheme, the survivor's pension is means-tested: if the gross annuel income of the surviving spouse exceeds a certain threshold (€23,441.60 if single, or €37,506.56 if in couple in 2023), the survivor's pension is reduced in due proportion.

If the deceased spouse has been married several times, the survivor pension is shared between the surviving spouse and the divorced ex-spouse(s). This division is proportional to the duration of each marriage.

The survivor pension is equal to 54% of the deceased spouse's or ex-spouse's first-pillar pension (or the first-pillar pension they could have benefited from). The survivor benefit cannot go below a certain threshold, provided the deceased spouse has validated at least 40 quarters.

- *Survivor pension in public sector schemes (FPE and CNRACL)*

To benefit from a survivor pension, the surviving spouse or ex-spouse of a public servant must qualify for at least one of the following conditions:

- to have been married to the deceased beneficiary for at least four years
- to have been married to the deceased beneficiary for at least two years before the deceased spouse retired;
- to have had at least one child with the deceased beneficiary.

In case the surviving spouse is in couple with a new partner (being married or not), the survivor pension is suspended.

The survivor pension is equal to 50% of the deceased spouse's or ex-spouse's pension (or the pension they could have benefited from). It can be increased by half of the '*majoration*' the deceased spouse benefited from for having raised at least three children.

c. Non-earnings-related minimum pension

People aged 65 and above (or 62 in case of incapacity or disability) whose revenues (including pensions) are below a certain ceiling (€ 11,532.96 a year for a single person and € 17,904.96 for a couple in 2023) are eligible to a non-contributory minimum pension, called ASPA (standing for "Allocation de solidarité aux personnes âgées") that tops revenues up to the aforementioned ceiling. ASPA-related expenditure amounted to € 4 billion in 2021, which represents 1 % of the total amount of pension expenditures (disability pensions excluded).

d. Disability pension

Disability pensions provide a replacement income for people who are completely or partially, temporarily or permanently, unable to work. These pensions are paid by the public health insurance schemes.

There are two different earnings-related disability pensions: the "rente Accident du Travail et Maladie Professionnelle (ATMP)" which is granted when the disability is related to work and the "Pension d'Invalidité (PI)" which is granted when it is not work-related. When disabled persons receiving a PI reach the legal retirement age, they become eligible to a full pension replacing their disability pension: their pension is no longer included in disability expenditures and is transferred into old-age expenditures' accounts. This is also true for PI for public servants even if in practice they receive a unique pension before and after legal retirement age. On the contrary, the ATMP pension can be cumulated with an old-age pension.

These earnings-related disability pensions are a fraction of a reference wage (the average of the ten best wages for PI and twelve last months for ATMP), depending on the disability level as described below. It cannot exceed a maximum nor be inferior to a minimum amount.

- For PI calculation, the percentage applied to the reference wage varies according to the disability class (1st class, 2nd class or 3rd class), from 30% (1st class) to 50% class (2nd class, with an additional 40% bonus for a disabled person who needs the assistance of a third party for 3rd class); the minimum is 311.56€ (1st class and 2nd class) per month, the maximum goes from 1,099.80€ (1st class) to 3,043.90€ (3rd class)[5].
- Concerning ATMP, the annual pension (P) equals: P = T x R, with:

  $T = 0.5 \times disabilityrate$ if disability rate $\leq 50\%$

  $T = 1.5 \times disabilityrate - 50\%$ if disability rate $> 50\%$

  $R = ref.wage$ if $ref.wage \leq R°$

  $R = R° + \frac{ref.wage - R°}{3}$ if $R° < ref.wage \leq 4R°$

  with R° = € 40,097.60. Revenues above 4R° are not factored into the calculation.

A non-earnings-related minimum disability pension ("Allocation aux adultes handicapés" - AAH) is also considered in the projections: AAH tops revenue of all disabled people up to a ceiling of € 971.37 per month in 2023. However, in the absence of a detailed breakdown of recipients and expenditures by profile, expenses related to Allocation spécifique invalidité (ASI), another non-earnings-related minimum disability pension which accounts for less than 250 M€ in 2018, are not included.

[5] *Source : Public administration official website*

Indexation rules

First-pillar old-age and survivor pensions and disability pensions (PI, ATMP) are price-indexed. Past wages taken into account for the pension calculation in the private sector first-pillar scheme are also valorised in line with prices.

From 2024 to 2026, benefits in the 2nd-pillar scheme AGIRC-ARRCO are indexed to CPI minus a sustainability factor of 0.4 point (CPI – 0.4%). From 2027 onwards, they are indexed to wages minus a sustainability factor of 1.16 point (average wage – 1.16%). The purchase price of a point is indexed to wages. The indexation over 2024-2026 follows the last agreement of October 2023 in the AGIRC-ARRCO scheme. From 2027 onward, the indexation rule applied is the one used by AGIRC-ARRCO when it makes its own projections.

In accordance with AWG guidelines, non-contributory minimum pensions (ASPA) are indexed to CPI inflation until 2032 and to wages thereafter. In comparison, the standard rule is price-indexation.

Pension taxation

Pensions are subject to the General Social Contribution (CSG) at a rate of 8.3%, the Social Debt Repayment Contribution (CRDS) at a rate of 0.5% and to two other contributions: a specific contribution at a rate of 0.3% aiming to finance long-term care (Additional Solidarity Contribution for Autonomy - Casa) and a contribution of 1% that finances the health insurance scheme that is levied only on second-pillar benefits.

Pensioners can benefit from a reduced rate of 3.8% of CSG if their income in 2023 – calculated on the reference taxable income for 2021 - is between €11,614 and €15,183 for a single tax unit, or from an intermediate rate of 6.6% if their reference taxable income is between €15,183 and €23,564 in 2021 for a single tax unit. They can also benefit from an exemption of CSG and CRDS if their income is below a certain ceiling (€11,614 for a single tax unit in 2023 – calculated on the reference taxable income for 2021). Also, the Additional Solidarity Contribution for Autonomy of 0.3% is only levied for pensioners subject to a CSG rate of 6.6% or 8.3%.

Pensions are also subject to income taxation (after a 10% rebate on the tax base). All in all, the average tax rate in 2022 was 11.1%: 4.4% for income taxation and 6.7% for other taxes (CSG-CRDS-Casa). It is applied on pensioners' income to compute net expenditure.

There is no taxation (CSG, CRDS, Casa, income taxation) on ATMP pensions nor on non-earnings-related minimum pensions (AAH, ASPA).

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

Since the 1990s, the French pension system has undergone several pension reforms. This section describes some of the latest reforms as well as the 1993's one as it has a major impact on the financial sustainability of the pension system. Section 4.3 provides a description of other reforms.

- The 1993 reform introduced mainly four changes that reduced pension benefits in the first-pillar scheme for private sector employees:
  - The number of years considered to compute the reference wage has been progressively raised from 10 to 25. It is thus now computed as the average of the 25 best years instead of the 10 best before the reform;
  - Past wages factored into the calculation of the reference wage have become price-indexed (instead of being wage-indexed as before);

- Pensions in the private sector first-pillar scheme have become price-indexed;
- The reference contribution period has been raised from 37.5 to 40 years for private sector employees.

➢ The 30 October 2015 agreement on the second-pillar pension schemes AGIRC and ARRCO introduced a series of measures related to: (i) the amount of pension benefits paid to retirees, (ii) retirement age, with incentives to postpone retirement, (iii) governance, with the merger of the executive (AGIRC) and non-executive (ARRCO) schemes, and (iv) social contributions.
- Indexations applied on pension benefits were lower than prices from 2016 to 2018, and, as from 2016, benefits will be upgraded each year in November instead of April.
- A system of temporary bonus/penalty was introduced in order to incentivize older workers to delay their retirement and remain in employment. For instance, for people who retire less than one year after being eligible to a full-rate pension, a 10% penalty applies for 3 years. Otherwise, the penalty does not apply and a temporary bonus applies if people retire at least two years after meeting the conditions for a full pension.
- The two schemes, AGIRC (for executives only) and ARRCO (for executives and non-executives), were merged in 2019 in order to reduce administrative costs.
- In the new unified scheme, the contribution base was broadened and some contribution rates were increased.

➢ The AGIRC-ARRCO's agreement of October 2023 contains several measures:
- Removal of the bonus/penalty coefficients introduced by the October 2015 agreement.
- From 2024 to 2026, indexation of pensions to CPI minus 0.4 point and indexation of the purchase price of the point to wages.

➢ The 2023 pension reform contains two main measures aimed at ensuring the financial sustainability of the pay-as-you-go system:
- A gradual rise of the minimum legal retirement age, for all pension schemes, from 62 to 64, at a rate of 3 months per year starting in September 1st, 2023. For example, people born in 1962 can retire at 62 and 6 months and those born in 1968 can retire at 64.
- An acceleration of the on-going 2014 reform that planned an increase in the contribution period required for a full pension. The contribution period will increase by 3 months for every single cohort (instead of every three cohorts); the target contribution period (43 years) will thus be reached for the cohort born in 1965 (instead of the 1973 cohort).

The age at which people can retire without penalty, whatever the contribution period, remains unchanged at 67.

The reform contains several measures aimed at protecting workers in specific conditions and reinforcing the rights of those who started to work early:
- The retirement age of the disabled remains unchanged at 62.
- The right to retire before the minimum legal retirement age is extended to people who started to work between 20 and 21. People who started to work before 18 are now allowed to retire from 60 under certain conditions.

- For workers who have been victim of a work-related accident or disease, the retirement age remains unchanged at 60 provided their invalidity rate is greater or equal to 20%. For those with an invalidity rate between 10 and 19%, the retirement age will be raised to 62 and the minimum period of exposure to hardship factors required to benefit from an early retirement reduced from 17 to 5 years.

Several measures are specifically aimed at increasing pension levels or facilitating the acquisition of quarters:

- The maximum level of the earnings-related minimum pension in the private sector was increased in September 2023 and the minimum pension is now indexed on the minimum wage at the time of retirement. These measures were taken to ensure that future retirees with a complete and full-time career paid at the minimum wage will receive a total gross old-age pension equivalent to 85% of the net minimum wage (nearly €1,200 gross per month in 2023).
- The small pensions of some current retirees were increased in September 2023.
- Periods spent as stay-at-home parents to take care of children (*assurance vieillesse des parents au foyer*) are now taken into account in the eligibility for the long careers scheme (up to 4 quarters) as well as in the earnings-related minimum pension calculation.
- The bonus system (*surcote*) will be effective one year before the minimum legal retirement age for people who meet the reference contribution period condition and benefit from extra quarters due to children.
- The main special schemes (RATP, electricity and gas industries, Banque de France, clerks and notaries, French Economic, Social and Environmental Council-CESE) were closed for new hires in September 2023; the new hires are now covered by the general scheme. As in the other schemes, the minimum retirement age for active service (e.g. local policemen, firemen, nurses) will gradually increase by 2 years (from 57 to 59 for the standard active service and from 52 to 54 for the super active service – e.g. prison guards).

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

The projections are built upon a "constant policy" principle and based on the legislation and rules as of December 2023. In particular, the measures of the pension reform legislated in April 2023 are incorporated.

In the AGIRC-ARRCO second-pillar scheme, from 2027 onwards, it is assumed that the point value is indexed to wages minus a sustainability factor of 1.16% and that the purchase price of a point is indexed to wages.[6] The returns are thus diminishing.

The non-contributory minimum pension (ASPA) is indexed to prices until 2032, which is the standard legislated rule, and to wages thereafter.

[6] Those are the indexation rules used by the AGIRC-ARRCO scheme in its agreement of October 2023 to make its own projections.

2. Overview of the demographic and labour force projections[7]

Part 2 contains a description of the main demographic changes implied by EUROPOP2023 and the changes in the labour force as projected by the Cohort Simulation Model. These provide the framework for the pension expenditure projections.

2.1. Demographic projections

Table 3 provides an overview of the expected demographic developments until 2070. Total population in France is projected to increase from 68.0 million people in 2022 to 69.7 million in 2070. It would peak at 70.7 million in 2046 and then decline until 2070.

During this period, population will age dramatically given the dynamics in fertility, mortality and migration. The old-age dependency ratio, which is the share of older people (aged 65 and above) relative to the working-age population (aged 20 to 64) is projected to increase from 38.2% in 2022 to 57.8% in 2070. The increase would be high before 2050 (+12 pts by 2040) due to the ageing of baby-boomer cohorts, and then be more moderate until 2060. As of the mid-2060s, the dependency ratio would again increase rapidly due to lag effects of the surge in fertility from the mid-1990s and the downward trend in fertility assumed after 2022. The change in the old-age dependency ratio means that France would move from having, for every person aged over 65 years, 2.6 people at working age in 2022 to 1.7 in 2070. Net migration flows would not suffice to offset the trend towards an ageing population.

Life expectancy at 65, which is a proxy for the duration of retirement, is projected to continuously increase over the 2022-2070 period, from 19.7 to 24.1 years for men and from 23.8 to 27.7 years for women, which would represent an increase of +4.4 years and +3.9 years between 2022 and 2070 respectively.

The *ageing of the aged ratio*, which is the share of people aged 80 and above relative to the population aged 65 and above, is projected to increase from 28.5% in 2022 to 42.8% in 2070. Among the group of 65+, the age composition would thus move towards a higher share of the elderly (80 and over).

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

TABLE 3 – MAIN DEMOGRAPHIC VARIABLES

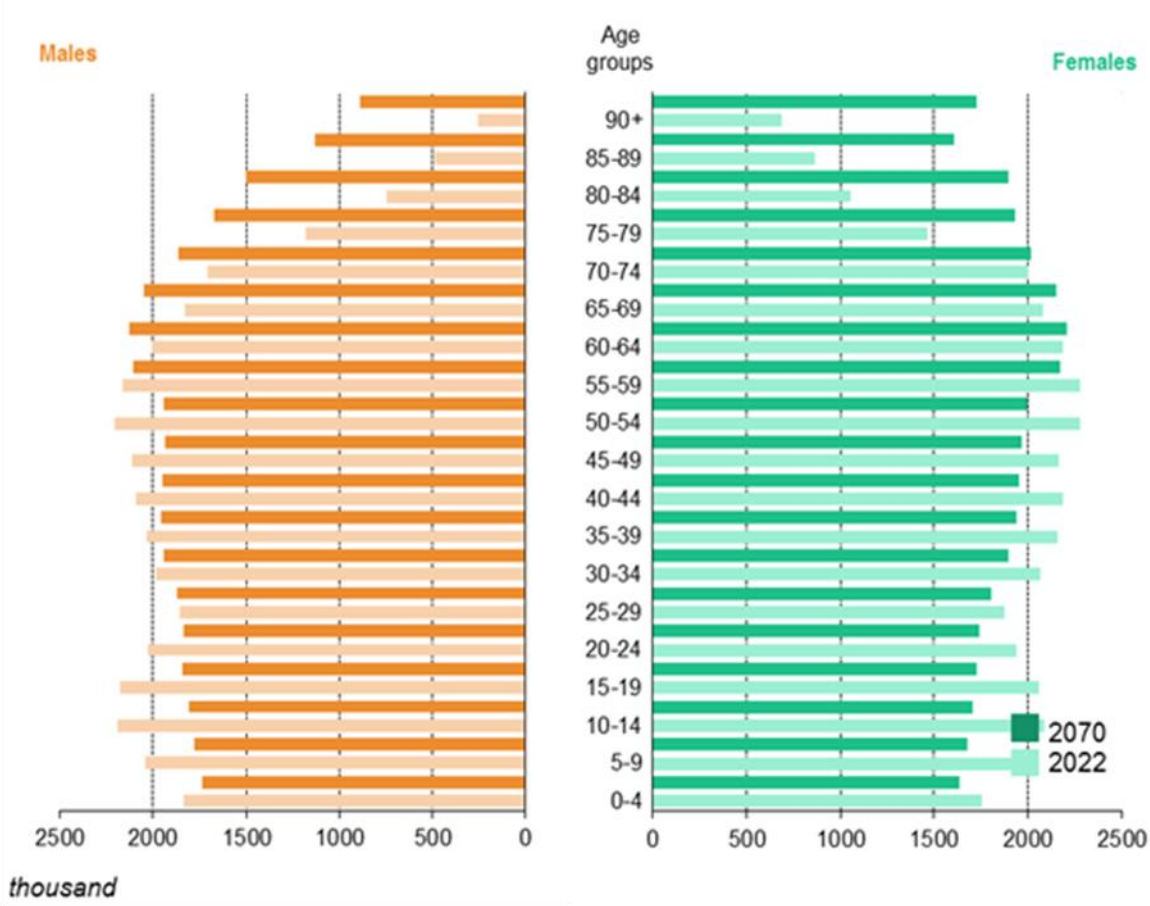
	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Population (thousand)	68 050	69 453	70 557	70 623	70 076	69 660	70 716	2046	1 611
Population growth rate	0,4%	0,2%	0,1%	-0,1%	-0,1%	0,0%	0,4%	2023	-0,5%
Old-age dependency ratio (pop 65+ / pop 20-64)	38,2	43,8	50,1	53,2	55,0	57,8	57,8	2070	19,7
Old-age dependency ratio (pop 75+ / pop 20-74)	14,9	18,8	23,0	26,0	27,3	28,5	28,5	2070	13,6
Ageing of the aged (pop 80+ / pop 65+)	28,5	31,6	36,3	40,0	41,6	42,8	42,8	2070	14,3
Men - Life expectancy at birth	79,7	81,1	82,7	84,1	85,5	86,7	86,7	2070	7,0
Women - Life expectancy at birth	85,9	86,9	88,2	89,3	90,4	91,3	91,3	2070	5,4
Men - Life expectancy at 65	19,7	20,6	21,5	22,4	23,3	24,1	24,1	2069	4,4
Women - Life expectancy at 65	23,8	24,5	25,4	26,2	27,0	27,7	27,7	2069	3,9
Men - Survivor rate at 65+	85,9	87,4	89,3	91,0	92,4	93,6	93,6	2070	7,7
Women - Survivor rate at 65+	92,8	93,6	94,5	95,3	96,0	96,6	96,6	2070	3,8
Men - Survivor rate at 80+	60,4	64,3	68,9	73,0	76,6	79,8	79,8	2070	19,4
Women - Survivor rate at 80+	77,9	80,4	83,1	85,5	87,6	89,3	89,3	2070	11,4
Net migration (thousand)	275,1	80,0	80,8	83,2	85,2	98,5	275,1	2022	-176,6
Net migration (% population previous year)	0,4%	0,1%	0,1%	0,1%	0,1%	0,1%	0,4%	2022	-0,3%

Source: Eurostat, European Commission.

The shift towards an older population is illustrated in Figure 2, which shows the change in the age distribution between 2022 and 2070. While in 2022 the largest age group for both males and females were people aged 50-54, in 2070 the 60-64 age group would be the largest in both cases. More generally, the age distribution would be flatter in 2070 than in 2022. Overall, the median age would rise from 42.2 years in 2022 to 47.6 years in 2070. For men, it would increase from 40.7 to 45.6 years, for women from 43.7 to 49.6 years.

Despite the ageing of the population, the size of younger cohorts should be high in 2070, which reflects a relatively high fertility rate over the projection period (1.8 on average over 2022-2070) although it is assumed to follow a decreasing trend.

FIGURE 2 – AGE STRUCTURE: 2022 VS 2070



Source: Eurostat, European Commission.

2.2. Labour force projections

The labour force is projected by the Commission on the basis of the demographic projections by ESTAT described in the previous section and the participation rates as projected by means of the Cohort Simulation Model. Key variables are shown in Table 4 and 5.

The labour force participation rate of the 20-64 is projected to increase from 79.6% in 2022 to 84.4% in 2055 and then remain roughly at this level until 2070 (Table 4). This upward evolution is mostly driven by an increase in the participation rate of older groups and of women.[8] The pension reform enacted in 2023 will indeed raise the minimum retirement age by two years as of 2032 and the required contributory period by one year by 2028, ultimately resulting in higher participation rates for the elderly through prolongation of working life. Participation rate of the 55-64 is expected to increase by 15.5 pps in the projection period, from 60.4% in 2022 to 75.9% in 2070. More than half of the increase (+8.5 pps) would occur by 2032 given the timing of the 2023 reform.

The increase in the participation rate of the 20-64 would be higher for women than for men. For women, it would increase from 76.3% in 2022 to 82.6% in 2070 (+6.3 pps), for men from 82.9% to 86.0% (+3.0 pps).

[8] See Table I.2.9 of Volume 1 of the 2024 Ageing Report.

TABLE 4 – 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	81,4	83,4	84,1	84,4	84,3	84,4	2058	4,7
Employment rate of workers aged 20-64	74,0	75,6	77,8	78,9	79,1	79,0	79,2	2058	5,0
Share of workers aged 20-64 in the labour force 20-64	93,0	92,9	93,3	93,7	93,7	93,7	93,7	2055	0,7
Labour force participation rate 20-74	67,3	68,4	70,0	71,0	71,1	70,6	71,1	2063	3,2
Employment rate of workers aged 20-74	62,7	63,6	65,3	66,5	66,6	66,2	66,7	2063	3,5
Share of workers aged 20-74 in the labour force 20-74	93,1	92,9	93,3	93,8	93,8	93,8	93,8	2056	0,7
Labour force participation rate 55-64	60,4	67,0	72,7	74,4	76,2	75,9	76,3	2061	15,5
Employment rate of workers aged 55-64	56,9	63,1	68,6	70,4	72,2	71,9	72,2	2061	14,9
Share of workers aged 55-64 in the labour force 55-64	94,3	94,2	94,3	94,6	94,7	94,7	94,7	2058	0,4
Labour force participation rate 65-74	6,8	6,9	8,9	10,0	9,8	10,4	10,5	2067	3,6
Employment rate of workers aged 65-74	6,5	6,6	8,5	9,6	9,4	10,0	10,1	2067	3,5
Share of workers aged 65-74 in the labour force 65-74	96,0	95,4	95,5	95,8	95,8	95,8	96,0	2022	-0,2
Median age of the labour force	41,0	41,0	41,0	41,0	42,0	42,0	42,0	2052	1,0

Source: European Commission.

The average effective retirement age, which excludes new disability pensioners, is expected to increase from 62.2 in 2022 to 64.9 in 2070 (+2.7 years; see Table 5). Most of the increase would be achieved by 2030 (+2.6 years) due to the 2023 pension reform which raises the minimum retirement age until 2032. The effective retirement age would continue increasing until 2040 due to longer schooling that induces people to retire later, and then stabilise at around 65 thereafter. Overall, the upward trend in retirement age over the projection period will reduce the number of retirees, thus counteracting the upward pressure of demographic ageing on pension expenditure.

TABLE 5 – LABOUR MARKET EXIT BEHAVIOUR

TOTAL	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	62,2	64,8	65,3	65,1	64,8	64,9	65,4	2052	2,7
Average labour market exit age (CSM)**	62,6	63,8	64,6	64,8	64,8	64,8	64,8	2042	2,2
Contributory period	33,9	31,1	31,6	31,7	33,9	34,3	34,3	2070	0,5
Duration of retirement***	23,9	23,4	23,5	24,3	25,2	25,9	25,9	2069	2,1
Duration of retirement/contributory period	70%	75%	74%	77%	74%	75%	80%	2055	5%
Percentage of adult life spent in retirement****	36%	35%	34%	35%	36%	37%	37%	2069	1%
Early/late exit*****	5,3	4,0	2,6	2,5	2,5	2,0	5,8	2024	-3,4

MEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	61,9								
Average labour market exit age (CSM)**	62,4	63,7	64,6	64,8	64,8	64,8	64,8	2042	2,4
Contributory period	39,0	31,1	32,3	32,9	34,6	35,4	39,0	2022	-3,5
Duration of retirement***	22,1	21,3	21,5	22,4	23,3	24,1	24,1	2069	2,0
Duration of retirement/contributory period	57%	68%	66%	68%	67%	68%	72%	2064	11%
Percentage of adult life spent in retirement****	34%	33%	33%	33%	34%	35%	35%	2069	1%
Early/late exit*****	4,2	4,3	2,7	2,5	2,5	2,0	5,0	2025	-2,2

WOMEN	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Average effective retirement age*	62,5								
Average labour market exit age (CSM)**	62,7	63,8	64,6	64,8	64,8	64,8	64,8	2042	2,1
Contributory period	29,1	31,2	31,0	30,6	33,3	33,2	33,3	2060	4,0
Duration of retirement***	25,6	25,4	25,4	26,2	27,0	27,7	27,7	2069	2,1
Duration of retirement/contributory period	88%	81%	82%	86%	81%	83%	90%	2036	-4%
Percentage of adult life spent in retirement****	37%	37%	36%	37%	38%	38%	38%	2069	1%
Early/late exit*****	6,4	3,6	2,5	2,5	2,4	1,9	6,7	2024	-4,5

** The 'average effective retirement age' is the age at which people start receiving an old-age pension benefit (disability and survivor pensions are excluded). It is calculated on the basis of the administrative data on new pensioners for 2022 (using 2021 data as data for 2022 are not yet available), 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.*

The effective retirement age is higher than the average labour market exit age as simulated by the Cohort Simulation Model throughout the projection period. More specifically, the differences are relatively significant until 2040, which corresponds to the period where effective retirement ages and exit ages increase due to reforms and longer schooling; after 2040, the two variables broadly stabilise at very close values. Several factors explain the differences. First, the average effective retirement age excludes new disability pensioners and is thus likely overestimated. Second, the two variables refer to two separate concepts, which measure two different things; for instance, some people can exit the labour market and become inactive for a certain period before retiring. Third, the impact of the 2023 reform on retirement behaviour is captured *via* two different modelling techniques: the retirement age is obtained by microsimulation which accounts for pension rules' complexity at the individual level, while the CSM relies on a shift of the exit rates age profile.[9] Fourth, retirement age is projected under the assumption that people retire once they are eligible to a full-rate pension, which has an upward effect on the average retirement age, while the CSM allows for more heterogeneity in retirement behaviour.

The duration of retirement would remain quite stable until the beginning of the 2040s (at around 23.5 years), as the gain in life expectancy would be offset by the rise in the average labour market exit

[9] See Annex 1 of Volume 1 of the 2024 Ageing Report.

age. Beyond 2040, it would increase and reach 25.9 years in 2070 as life expectancy continues increasing while exit age stabilises.

As for the contributory period, it follows a downward trend until roughly 2040 due to later entries into the labour market because of longer schooling. It then increases as a result of higher projected participation rates and lower unemployment rates.

3. Pension projection results

3.1. Coverage of the pension projections

The projections cover all public pensions (earnings-related and non-contributory minimum pensions, disability pensions and survivor pensions). There is no flat component in the French pension system. Within the old-age and survivor pensions, all first and second-pillar mandatory schemes are covered, except the RAFP scheme. Given their low weight in the French pension system, occupational pensions (with contractual agreements between employers and employees) are not covered in the projections. Private mandatory pensions do not exist in France.

Disability pensions include the allowance for disabled adults (AAH – *Allocation aux adultes handicapés*), the pension for adults with a work-related disability that reduces their capacity to work (ATMP – *Accidents du travail et maladies professionnelles*) and the disability pension *per se* (see Section 1.1.d for a description). These three components are covered in the projections even though they are part of health expenditure in the French accounting system.

TABLE 6 – ESSPROS AND AWG DEFINITION OF PENSION EXPENDITURE (% GDP)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	change 2013- last available year
Eurostat total pension expenditure	15,1	15,1	15,1	15,1	14,9	14,9	14,7	15,9	:	0,8
Eurostat public pension expenditure (A)	:	:	:	:	:	:	:	:	:	:
Public pension expenditure (AWG: outcome) (B)	14,9	15,0	14,9	14,9	14,8	14,7	14,5	15,7	14,7	-0,2
Difference Eurostat/AWG: (A)-(B)	:	:	:	:	:	:	:	:	:	:

Source: Eurostat, European Commission.

3.2. Overview of projection results

Gross public pension spending (14.4% of GDP in 2022) is predicted to slightly decrease by 2034 (-0.1 pps of GDP) and then follow a downward trend until mid-2060s where it would reach a minimum at 13.4% of GDP (see Table 7). It would increase in the end of the projection period and reach 13.6% of GDP in 2070, which represents an overall decrease of 0.9 GDP point over the whole 2022-2070 period.

TABLE 7 – 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	**14,4**	**14,3**	**14,1**	**13,7**	**13,5**	**13,6**	**14,4**	**2022**	**-0,9**
Private occupational pensions	:	:	:	:	:	:	:	:	:
Private individual mandatory pensions	:	:	:	:	:	:	:	:	:
Private individual non-mandatory pensions	:	:	:	:	:	:	:	:	:
Gross total pension expenditure	14,4	14,3	14,1	13,7	13,5	13,6	14,4	2022	-0,9
Net public pension expenditure*	12,8	12,7	12,5	12,2	12,0	12,1	12,8	2022	-0,8
Net total pension expenditure*	12,8	12,7	12,5	12,2	12,0	12,1	12,8	2022	-0,8
Contributions									
Public pension contributions	11,1	10,9	11,0	11,0	11,0	11,0	11,1	2055	-0,1
Total pension contributions	11,1	10,9	11,0	11,0	11,0	11,0	11,1	2055	-0,1
Balance of the public pension system (%GDP)**	-3,3%	-3,4%	-3,1%	-2,7%	-2,5%	-2,5%	-3,4%	2028	0,8%

**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.

The 2022-2070 evolution of the spending ratio can be divided into five sub-periods (see Figure 3):

- Phase 1: From 2022 to 2024, the expenditure ratio would exhibit strong oscillations: in 2023, it would decrease by 0.3 pps of GDP compared to 2022, due to a significant gap between the annual legal indexation applied to first-pillar old-age and early pensions (+2.8% on average in 2023) which is diminished due to the anticipated indexation (+4%) applied in July 2022 instead of January 2023, and, on the other hand, the evolution of the GDP deflator (+5.4%). Symmetrically, in 2024, the expenditure ratio would rebound by 0.1 GDP point, due to the lag effect of the high inflation in 2023 (+5.5% for the CPI) on the level of pensions in 2024 while the GDP deflator would reflect a much lower CPI change in 2024 (+2.5%).

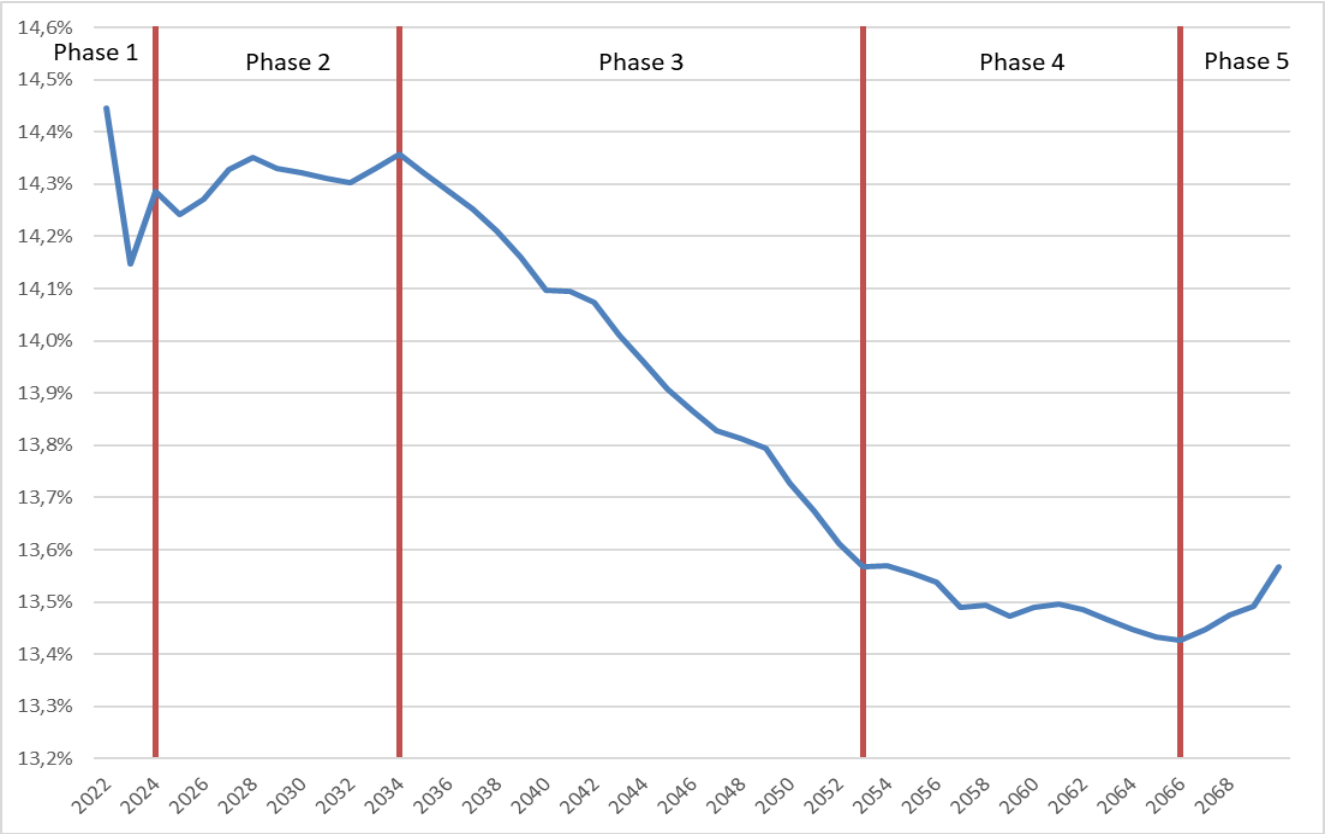
- Phase 2: Between 2024 and 2034, expenditure as measured as a percentage of GDP would slightly increase (+0.1 GDP point). This increase would stem from the ongoing sustained pace of ageing and the retirement of large baby-boomer cohorts. It would be offset by the 2023 pension reform which reduces the number of new retirees through a gradual increase in the retirement age until 2032. The reform would compensate the relatively low level of labour productivity growth in the period which is insufficient to counterbalance by itself the upward pressure on spending due to ageing. To a lesser extent, the increase in the employment rate limits the growth in the spending ratio.

- Phase 3: Between 2034 and 2053, expenditure would decrease by 0.8 GDP point, mainly due to an increase in labour productivity growth and, to a lesser extent, an increase in the employment rate. These two factors would be supported by the ongoing increase in retirement age until 2040 due to later entries into the labour market and by a reduced pace in the ageing process between 2040 and 2053.

- Phase 4: Between 2053 and 2066, expenditure is projected to decrease only slightly by 0.1 GDP point, due to a continued decline in productivity growth that beginning in 2043. In this period, the opposite effects of labour productivity gains and of ageing on the spending ratio would broadly cancel off.

- Phase 5: Between 2066 and 2070, expenditure would increase by 0.1% point of GDP due to an increase in ageing reflecting (i) a resurgence in fertility in the late 1990s, which would result in a significant increase in the population of the 65 and over from the 2060s onwards, and (ii) a decrease in fertility in the projection period, which results in a decrease in the 20-64 population relative to the 65+ population. The increase in the spending ratio is also explained by lower labour productivity gains.

FIGURE 3 – PROJECTED PENSION EXPENDITURE (% GDP)



Source: French Treasury's calculations based on INSEE simulated data.

Net public pension expenditure would decrease from 12.8% point of GDP in 2022 to 12.1% in 2070.

Developments of pension contributions and the balance of the public pension system are commented in Section 3.4.

Old-age earnings-related pensions, which represent the major share of total pension expenditure (about 82% in 2021), follow the same evolution as described previously: it would, as a share of GDP, go down from 11.8% in 2022 to 11.1% of GDP in 2070 (-0.7 pps; see Table 8). By raising the minimum legal retirement age and increasing the required contributory period, the 2023 pension reform should reduce expenditure on old-age earnings-related pensions. On average over the 2023-2050 period, spending on old-age earnings-related pensions (as a % of GDP) is 0.2 pp lower than it would have been without the reform. The effect of the reform on spending would reach a maximum in 2032 (-0.3 pps on the earnings-related pension expenditure-to-GDP ratio in 2032) as it corresponds to the year where the minimum legal retirement age will reach its target (64 years). After 2032, the gain induced by the 2023 reform would diminish as the effective retirement age would have spontaneously increased even absent the 2023 reform due to later entries into the labour market and the 2014 reform that increases the contributory period. In the long run, the gain due to the 2023 reform should be close to zero as the reduction in the number of retirees induced by the reform would be offset by a higher average pension level. Indeed, as people delay their retirement due to the 2023 reform, they acquire more rights which lead to higher pensions. The new indexation of the earnings-related minimum pension to wages (instead of prices) will also lead to higher benefits. The reduction in spending caused by the reform would progressively shrink as flows of new pensioners impacted by the reform modify the composition of the retirees' population.

Spending on non-contributory minimum pensions (ASPA) is projected to increase throughout the projection period, from 0.2% in 2022 to 0.5% of GDP in 2070 (+0.4 pps). From 2033 onwards, in accordance with AWG guidelines, the non-contributory minimum pension is indexed to the average wage instead of prices, hence more rapidly. This has two consequences: (i) more people will become eligible to the minimum pension as the threshold is higher, and (ii), for those already eligible, the amount received will be higher.

Survivors' pensions, as a share of GDP, are expected to decline from 1.5% in 2022 to 1.0% of GDP in 2070 (-0.4 pps). The overwhelming majority of survivor pensions' beneficiaries are women (88% in 2021): the reduction of the gender gap in life expectancy, the relative increase in the level of women old-age earnings-related pensions due to a rise in their employment rate, and the decrease in the number of marriages imply that women will benefit from lower amounts of survivors' pensions and for shorter periods over the projection period.

Spending on disability pensions is projected to decrease from 1.0% in 2022 to 0.9% of GDP in 2070 (-0.2 pps). Part of the reduction is due to the price-indexation of the non-contributory component of disability pensions (AAH).

TABLE 8 – GROSS PUBLIC PENSION SPENDING BY SCHEME (% GDP)

	2022	2030	2040	2050	2060	2070	peak value	peak year	change 2022-2070
Total public pensions	14,4	14,3	14,1	13,7	13,5	13,6	14,4	2022	-0,9
Old-age and early pensions	12,0	11,8	11,8	11,6	11,5	11,7	12,0	2022	-0,3
Flat component	:	:	:	:	:	:	:	:	:
Earnings-related	11,8	11,6	11,4	11,2	11,0	11,1	11,8	2022	-0,7
Minimum pensions (non-contributory)	0,2	0,2	0,3	0,4	0,5	0,5	0,5	2070	0,4
Disability pensions	1,0	1,0	1,0	0,9	0,9	0,9	1,0	2024	-0,2
Survivor pensions	1,5	1,5	1,4	1,2	1,1	1,0	1,5	2031	-0,4
Other pensions	:	:	:	:	:	:	:	:	:

Source: European Commission, EPC.

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

This part provides more details about the development of public pension expenditures (Table 9). It uses a standard arithmetic disaggregation of the pension expenditures-to-GDP ratio into the dependency ratio, coverage ratio, benefit ratio and a labour market effect (see Figure 4, first equation).

FIGURE 4 – DISAGGREGATION OF PUBLIC PENSION EXPENDITURE

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

$$\overbrace{\frac{\text{number of pensioners}}{\text{population 65+}}}^{\text{coverage ratio}} = \overbrace{\frac{\text{number of pensioners 65+}}{\text{population 65+}}}^{\text{coverage ratio old–age}} + \left(\overbrace{\frac{\text{number of pensioners} \leq 65}{\text{population 50–64}}}^{\text{coverage ratio early–age}} \times \overbrace{\frac{\text{population 50–64}}{\text{population 65+}}}^{\text{cohort effect}} \right) \quad [2]$$

$$\overbrace{\frac{\text{population 20–64}}{\text{hours worked 20–74}}}^{\text{labour market effect}} = \overbrace{\frac{\text{population 20–64}}{\text{employed people 20–64}}}^{\text{employment rate}} \times \overbrace{\frac{\text{employed people 20–64}}{\text{hours worked by people 20–64}}}^{\text{labour intensity}} \times \overbrace{\frac{\text{hours worked by people 20–64}}{\text{hours worked by people 20–74}}}^{\text{career shift}} \quad [3]$$

Source: European Commission, EPC.

Decomposition [1] in Figure 4 provides a descriptive framework that enables to identify the economic factors behind the evolution of the expenditure-to-GDP ratio described previously.

Among the four drivers, the dependency ratio (population 65+/population 20-64) is the one that exerts an upward pressure on spending. It would, *ceteris paribus*, increase public pension expenditure by 6.0 pps of GDP between 2022 and 2070 (see Table 9). Two thirds of the effect on the spending ratio (+4.1 pps of GDP) is expected to occur by 2040. The upward effect would then decelerate in the following two decades (+0.8 pps of GDP in 2040-50 and +0.5 pps in 2050-60) as the ageing process would slow down. It is expected to accelerate again at the end of the projection period (+0.7 pps of GDP in 2060-70) as the dependency ratio would grow faster, reflecting a downward trend in fertility rate over the projection period that would result in a decrease of the 20-64 population relatively to the 65+ population.

The coverage ratio (pensioners/population 65+) is expected, *ceteris paribus*, to reduce the public pensions-to-GDP ratio by 2.2 pps of GDP by 2070, with almost the entire reduction to occur by 2040 (-2.1 pps of GDP). The downward effect on spending would be relatively high in 2022-30 (-1.4 pps of GDP) as the 2023 pension reform progressively reduces the number of new retirees, and thus the coverage ratio, through a gradual increase in the minimum legal retirement age from 62 in 2022 to 64 in 2032. The tightening of the eligibility conditions for retirement is expected to increase the average effective retirement age by 7 months in 2030. The effect of the reform on the flow on new retirees would stabilise from 2032 onwards; however, the coverage would still decrease, reflecting an increase in the average retirement age due to longer schooling which would delay the entry into the labour market, and induce the spending ratio to decrease by 0.7 GDP point in 2030-40. After 2040, the coverage ratio would not exert any sizeable effect on the spending ratio as the average retirement age broadly stabilises.

The projected reduction in the benefit ratio (average pension/GDP per worker) is a key determinant of the downward trend of the spending ratio, accounting for 3.4 GDP points of the overall decrease by 2070. The reduction in the benefit ratio reflects the lower growth pace of the average pension compared to that of the GDP per worker. Indeed, pensions are price-indexed while the nominal GDP per worker evolves in line with labour productivity and the GDP deflator; as productivity growth is positive and the GDP deflator evolves in line with the CPI as of 2027, the benefit ratio is projected to decrease. By 2030, these indexation mechanisms would reduce the spending ratio by 0.4 GDP point, which is relatively limited due to low labour productivity gains in that period. In 2030-40 and 2040-50, the benefit ratio effect would be twice as high as in the 2022-30 period (respectively -0.9 and -1.0 pps of GDP) as productivity gains are much higher. In the last two decades of the projection period, in 2050-60 and 2060-70, the downward effect of the benefit ratio on spending should be smaller (respectively -0.6 and

-0.5 pps of GDP) due to a decline in labour productivity growth. Besides, in the long run, the decrease of the benefit ratio would be somewhat mitigated by the 2023 pension reform that increases the average pension level through (i) several specific measures (see Section 1.2) and (ii) later retirements that result in additional pension rights.

The labour market ratio (population 20-64/employment 20-74) captures the effect on the public pensions-to-GDP ratio associated with the development of the employment situation. It is expected to reduce the spending ratio by 1.0 GDP point between 2022 and 2070. Most of the downward effect would occur by 2040 (-0.8 GDP point) as the participation rate would increase rapidly by then and the unemployment rate would decrease at the same time. The rapid increase of the 20-64 participation rate by 2040 would mostly be driven by the 55-64 age group due to the 2023 pension reform (see Section 2.2). Indeed, by delaying the legal retirement age and increasing the contributory period, this reform would maintain older workers longer in the workforce and thus improve the participation rate. The effect of the labour market ratio is projected to be not significant beyond 2050 as the employment rate broadly stabilises.

TABLE 9 – FACTORS BEHIND THE CHANGE IN PUBLIC PENSION EXPENDITURE BETWEEN 2022 AND 2070 (PPS OF GDP) – PENSIONERS[10]

	2022-30	2030-40	2040-50	2050-60	2060-70	2022-70
Public pensions to GDP	-0,1	-0,2	-0,4	-0,2	0,1	-0,9
Dependency ratio effect	2,0	2,0	0,8	0,5	0,7	6,0
Coverage ratio effect*	-1,4	-0,7	0,0	0,0	-0,1	-2,2
Coverage ratio old-age	-0,3	-0,2	0,0	0,0	0,1	-0,3
Coverage ratio early-age	-3,2	-1,6	0,4	-0,2	-0,4	-5,0
Cohort effect	-2,2	-2,0	-0,8	0,1	-0,6	-5,4
Benefit ratio effect	-0,4	-0,9	-1,0	-0,6	-0,5	-3,4
Labour market effect	-0,3	-0,5	-0,2	0,0	0,0	-1,0
Employment ratio effect	-0,3	-0,4	-0,2	0,0	0,0	-0,9
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	0,0	-0,1	0,0	0,0	0,0	-0,1
Residual	-0,1	-0,1	0,0	0,0	0,0	-0,3

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

Source: European Commission, EPC.

The benefit ratio related to old-age earnings-related pensions, which expresses the average old-age earnings-related pension benefit in terms of the average wage, is expected to decrease from 45% in 2022 to 34% in 2070 (Table 10). This decrease results from the price-indexation of pensions while the average wage evolves in line with labour productivity gains, hence more rapidly. The benefit ratio would decrease only slightly by 2030 (from 45% to 44%) as productivity gains are assumed to be relatively low in the period. The reduction would be higher between 2030 and 2050 (from 44% to 38%), reflecting higher gains in labour productivity. It should then be lower between 2050 and 2070 (from 38% to 34%) as labour productivity growth is assumed to decrease and the average level of pension would grow more rapidly than in previous decades. Indeed, long-term future retirees should benefit from more favourable economic conditions, in particular higher participation rates and lower unemployment rates. Besides, the 2023 pension reform will induce higher pensions, in particular through longer careers and the indexation of the earnings-related minimum pension to wages. The growth in the average pension would be higher for women than for men since (i) the gender gap in participation rates is projected to shrink

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

and (ii) the 2023 reform contains several measures aiming at raising the level of women's pensions (pension bonus for mothers who meet the required contributory period before reaching the earliest retirement age, inclusion of some childbearing periods in the calculation of the earnings-related minimum pension, etc.).

The benefit ratio on all public schemes, including non-contributory minimum pensions, survivors' pensions, disability pensions on top of earnings-related pensions, would follow the same evolution as the benefit ratio on earnings-related pensions described above as earnings-related pensions represent the major share of total average pension (82% in 2021).

The replacement rate at retirement, which expresses the average old-age earnings-related pension of new retirees as a share of the average wage at retirement, is expected to decrease from 42% in 2022 to 34% in 2070. The average wage at retirement would indeed grow faster than the average earnings-related pension of new retirees. This results from several factors:

- The rise in the contributory period required to draw a full pension until 2028. It reduces the first-pillar pension benefit for people retiring at 67 without a full career *via* the pro rata coefficient. Indeed, although those retiring at 67 will still be granted a full-rate pension, the pro rata coefficient that enters the benefit formula will be reduced due to a higher reference period.

- The price-valorisation of past wages entering into the benefit formula in the first-pillar scheme in the private sector. The past wages that are considered to compute the average of the 25 best years are valorised on prices, hence less rapidly than the wage-indexation. The average of the 25 best years thus evolves less rapidly than wages over time, which reduces the replacement rate.

- The decreasing returns in the AGIRC-ARRCO second-pillar scheme, which implies that one euro in contributions progressively generates fewer pension rights. In the AGIRC-ARRCO scheme, people acquire points each year depending on the level of their contributions. Decreasing returns means that the point value evolves less rapidly than the purchase price of the point, resulting in a decreasing ratio between the point value and the purchase price. Due to diminishing returns, a same level of contributions buys fewer and fewer points over time. Thus, the number of points acquired evolves less rapidly than wages, which has a downward effect on the replacement rate.

TABLE 10 – 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)	47%	47%	43%	41%	39%	37%	-10%
Coverage	100%	100%	100%	100%	100%	100%	0%
Public scheme: old-age earnings related (BR)	45%	44%	41%	38%	36%	34%	-11%
Public scheme: old-age earnings related (RR)	42%	39%	41%	34%	36%	34%	-7%
Coverage	85%	85%	86%	87%	88%	89%	4%
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual schemes (BR)	:	:	:	:	:	:	:
Private individual schemes (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Total benefit ratio	47%	47%	43%	41%	39%	37%	-10%
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.

The number of pensioners is expected to increase from 20.3 million in 2022 to 24.6 million in 2070, which represents a total growth of +21.6% over the projection period (Table 11). The increase would be high by 2040 (+11.1%) as cohorts of baby-boomers would retire in the period. It would be mitigated by the 2023 pension reform which should reduce the number of pensioners by 1.3% in 2040 and 1.2% in 2070. The effect of the reform would be higher in 2030 than in 2040 and 2070 given the timing of the reform: it should reduce the annual growth in pensioners by 0.3% on average between 2022 and 2030, and thus the number of pensioners by 2.0% in 2030.

As employment is expected to increase relatively slightly by 2070 (+1.1%), the pension system dependency ratio, which expresses the number of pensioners over the number of employed, should increase from 0.7 point in 2022 to 0.8 point in 2070 (Table 11). This means that France would move from having, for every pensioner, 1.4 employed people in 2022 to 1.2 in 2070.

The previous economic-wise developments, which capture the features of both the pension system and the labour market, can be compared to expected demographic changes through the system efficiency, defined as the ratio of the system dependency ratio and the old-age dependency ratio. The system efficiency is projected to decrease from 1.8 in 2022 to 1.5 in 2070. This means that the pension system should be able to contain part of the upward pressure from demographic ageing on expenditure. This result is due to a decrease in the coverage ratio, reflecting a projected increase in the retirement age, and an increase in the employment rate.

TABLE 11 – SYSTEM DEPENDENCY RATIO AND OLD-AGE DEPENDENCY RATIO

	2022	2030	2040	2050	2060	2070	change 2022-2070
Number of pensioners (thousand) (I)	20263	21034	22510	23450	23993	24649	4386
Employment (thousand) (II)	28969	29573	30007	29992	29811	29285	316
Pension system dependency ratio (SDR) (I)/(II)	0,7	0,7	0,8	0,8	0,8	0,8	0,1
Number of people aged 65+ (thousand) (III)	14350	16441	18511	19336	19797	20436	6085
Working-age population 20-64 (thousand) (IV)	37604	37578	36915	36321	35981	35333	-2270
Old-age dependency ratio (OADR) (III)/(IV)	0,4	0,4	0,5	0,5	0,6	0,6	0,2
System efficiency (SDR/OADR)	1,8	1,6	1,5	1,5	1,5	1,5	-0,4

Source: European Commission, EPC.

Share of pensioners among the total population

Over 2022-2070, the share of pensioners varies the most among the 60-64's as changes in retirement behaviour mostly occur in this age bracket. The share of pensioners would be reduced by more than half between 2022 (64.1%) and 2070 (31.1%). The drop should be massive by 2030 (38.0%) due mostly to the 2023 pension reform whose effects on retirement behaviour continue until 2032. The ratio would continue decreasing until 2040 where it would reach 29.6% due to later entries into the labour market. Thereafter, it would roughly stabilise at around 32%.

The share of pensioners in the 65-69 age group would follow the same profile as the 60-64 until 2060, though in a much lower intensity: it is expected to decrease from 101.9% in 2022 to 90.4% in 2060. The ratio would slightly increase in the last decade of the projection period (+2.5 points between 2060 and 2070). Indeed, people born after mid-1990s have shorter schoolings[11] and would thus more frequently meet the required contribution period before reaching the automatic full-pension age at 67. They would then retire more frequently before 67, which would increase the share of pensioners in the 65-69 age group in the 2060s.

In the other age groups, the share of pensioners would remain broadly stable over the projection period.

For some age groups, the ratio is above 100% as the numerator includes pensioners living abroad while the denominator is restricted to the French territory. Pensioners living abroad account for approximately 6% of total pensioners.

The profile of the share of pensioners among the total population is the same between men and women. Still, in some age groups, there are some gender differences in the level of the ratio. In the 55-59, the share is higher for women as they are more likely to benefit from a survivor pension at those ages. In the 60-64, the share is roughly the same between men and women, which is due to opposite factors. On the one hand, women are more often beneficiaries of a survivor pension - like in the 55-59 age group – and they meet more frequently the required contributory period at the legal minimum retirement age (64 as of 2032) due to extra quarters granted for childbearing. On the other hand, men are more likely to fulfil the eligibility conditions related to the long career scheme under which retirement is possible before the legal retirement age. These gender-wise factors go in opposite direction and result in a similar share of pensioners between men and women.

Share of pensioners among the inactive population

In the 60-64 age group, the number of pensioners follows the same profile as the inactive population: it decreases until 2040 and broadly stabilises thereafter. There are however some differences. First, the downward trend by 2040 is steeper for the number of pensioners than for the inactive, which is reflected

[11] According to a 2018 study by the French statistical office, the reduction in schooling for people born from the mid-1990s is due to a reduction in school repetitions and the development of apprenticeship.

in a decrease of the share of pensioners among the inactive population between 2022 and 2040. One reason is that some people who delay retirement, either because of the 2023 pension reform or because of longer schooling, are inactive. In this particular case, the number of pensioners is reduced while the inactive population is the same. Second, after 2040, the number of pensioners slightly increases while the number of inactive slightly decreases, which is reflected in an increase of the share of pensioners among the inactive population between 2040 and 2070. One reason is that, in the 60-64 age group, part of the decrease in the number of inactive is reflected in higher contributory periods reached at 64 (because people tend to work more) and thus in a higher number of people eligible for a full-rate pension at 64. In that case, the number of inactive people decreases while the number of pensioners at 64 increases.

In the 65-69 age group, the number of pensioners follows the same evolution as the inactive population, which is reflected in a rather stable ratio between the two variables.

TABLE 12 – PUBLIC PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

pensioners / inactive population	2022	2030	2040	2050	2060	2070
Age group -54	7,2	7,4	7,5	7,7	7,7	7,5
Age group 55-59	89,2	90,8	94,5	98,7	105,5	100,4
Age group 60-64	105,2	79,0	79,2	89,3	102,3	93,2
Age group 65-69	113,6	107,4	106,9	109,5	109,8	113,3
Age group 70-74	110,8	110,1	109,8	111,9	109,3	112,4
Age group 75+	110,3	108,8	108,1	107,3	107,7	107,3

pensioners / total population	2022	2030	2040	2050	2060	2070
Age group -54	3,1	3,1	3,1	3,2	3,1	3,1
Age group 55-59	17,4	16,6	16,8	15,6	15,5	14,7
Age group 60-64	64,1	38,0	29,6	31,3	34,2	31,1
Age group 65-69	101,9	95,2	90,1	90,6	90,4	92,9
Age group 70-74	107,5	107,8	108,0	109,6	107,0	110,0
Age group 75+	110,3	108,8	108,1	107,3	107,7	107,3

Source: European Commission, EPC.

TABLE 13 – FEMALE PENSIONERS TO (INACTIVE) POPULATION BY AGE GROUP (%)

female pensioners / inactive population	2022	2030	2040	2050	2060	2070
Age group -54	6,7	6,9	6,9	7,1	7,0	6,8
Age group 55-59	87,5	85,7	87,5	98,0	107,5	101,6
Age group 60-64	95,4	79,5	77,1	83,4	98,9	90,4
Age group 65-69	111,0	106,2	109,7	110,4	110,5	113,1
Age group 70-74	109,9	110,1	109,9	112,0	109,9	112,6
Age group 75+	109,7	109,1	108,3	107,4	108,0	107,9

female pensioners / total population	2022	2030	2040	2050	2060	2070
Age group -54	3,0	3,0	3,0	3,0	2,9	2,9
Age group 55-59	19,2	18,1	17,9	16,2	16,3	15,4
Age group 60-64	58,5	39,4	30,2	30,4	33,7	30,5
Age group 65-69	101,4	94,0	93,1	91,8	91,2	92,8
Age group 70-74	107,7	107,7	108,1	109,7	107,7	110,2
Age group 75+	109,7	109,1	108,3	107,4	108,0	107,9

Source: European Commission, EPC.

To understand better the dynamics of the pension projections, Table 14 provides information on (i) new old-age earnings-related public pension expenditure, (ii) the number of new pensions, (iii) average contributory periods, (iv) average accrual rates, (v) average pensionable earnings, (vi) sustainability or adjustment factors and (vii) the number of months a pension benefit is received the first year. Data on Table 14 are related to defined-benefit schemes of the French pension system[12]; for results on point system schemes, see Annex B.

The number of new old-age earnings-related pensions is expected to grow until 2040 and then broadly stabilise.[13] This evolution reflects longer schooling and, to a lesser extent, the rise in the contributory period required to be eligible to a full-rate pension. Indeed, the average age at which people achieve their studies is projected to increase until 2040 for new retirees, so people will meet the required contributory period at older ages. However, they will have to wait at most until 67 to retire.[14]As a consequence, the share of people retiring at 67, and thus the number of new retirees, should increase until 2040.

The contributory period, strictly defined here as the number of years spent in employment, would follow a V-shape profile over the projection period, decreasing from 34 years in 2022 to 32 years in 2040 and increasing thereafter to reach 34 years in 2070. By 2040, the rise in schooling duration would have a downward effect on the average contributory period which would not be offset by higher retirement ages. More specifically, the average age at which people achieve their studies is projected to increase by 2.5 years for the new retirees between 2022 and 2040 and broadly stabilise thereafter. Moreover, the rise in the average effective retirement age would not be as high as the legal increase in the retirement age as planned by the 2023 pension reform, since disability pensioners are exempt and people that would retire above 62 without the reform are less affected by the reform.[15] As a result, the net effect is a reduction in the average contributory period between 2022 and 2040. After 2040, as schooling duration stabilises and the economic conditions are projected to improve (higher participation rates, lower unemployment rates), the average contributory period follows an upward trend for new retirees. The post-2040 upward trend is mostly driven by women as their employment rate would increase more than that of men.

Throughout the 2022-2070 period, the average accrual rate[16] would be higher for women than for men (1.5% against 1.3% per year on average over 2022-2070). Indeed, in most cases, the old-age earnings-related pension benefit does not derive directly from the monthly average pensionable earnings and the contributory period as reported in Table 14. The pension system includes several solidarity components that either compensate for a low level of the average pensionable earnings or boost the contributory period. Women benefit more from these components than men, which is reflected in higher accrual rates. For instance, extra quarters are granted to mothers with children; as those extra quarters are conventionally not included in the contributory period as reported in Table 14 (which corresponds to working periods only), they are reflected in higher accrual rates.

Besides, the average accrual rate is expected to slightly decrease for women while it would remain fairly constant for men. The downward trend for women would mainly reflect an increase in the average

[12] Which are mostly the first-pillar old-age pension schemes (sometimes called "basic schemes").

[13] Such a profile is not readily reflected in Table 14 as only a few values are reported.

[14] Someone who retires at 67 is entitled to a full-rate pension, whatever her career length.

[15] Suppose someone born in 1968 who retires at 63 before the 2023 reform. After the reform, her minimum legal retirement age will raise from 62 to 64, so she will retire at 64. The effect on the effective retirement age is then +1 year which is less than the increase in the legal retirement age (+2 years).

[16] The accrual rate measures the rate at which pension benefits are accrued each year spent in employment given the level of earnings.

contributory period and a lesser role played by the bonus quarters granted for childbearing in the pension level.

TABLE 14 – BREAKDOWN OF NEW PUBLIC PENSION EXPENDITURE (OLD-AGE AND EARLY EARNINGS-RELATED PENSIONS) – DEFINED-BENEFIT SCHEMES

TOTAL	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	5598,4	7008,4	11217,5	14114,6	23030,1	32348,8
I. Number of new pensions (1000)	782,7	743,0	874,1	798,3	952,2	958,2
II. Average contributory period (years)	33,9	31,1	31,6	31,7	33,9	34,3
III. Average accrual rate (%)	1,5	1,4	1,4	1,4	1,4	1,4
IV. Monthly average pensionable earnings (1000 EUR)	2,2	3,1	4,1	5,3	7,2	10,2
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	6,5	6,9	6,9	7,3	7,1	6,8
Monthly average pensionable earnings / monthly economy-wide average wage	65%	73%	74%	68%	66%	68%

MEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	3110,2	3290,2	5417,6	6974,1	12273,1	17750,8
I. Number of new pensions (1000)	376,3	353,5	405,2	375,1	467,7	491,7
II. Average contributory period (years)	39,0	31,1	32,3	32,9	34,6	35,4
III. Average accrual rate (%)	1,2	1,4	1,4	1,4	1,3	1,3
IV. Monthly average pensionable earnings (1000 EUR)	2,5	3,2	4,4	5,5	7,5	10,9
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	6,8	6,8	7,0	7,4	7,6	7,0
Monthly average pensionable earnings / monthly economy-wide average wage	75%	76%	79%	71%	69%	73%

WOMEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	2488,2	3718,2	5800,0	7140,4	10757,0	14597,9
I. Number of new pensions (1000)	406,4	389,5	468,9	423,2	484,5	466,5
II. Average contributory period (years)	29,1	31,2	31,0	30,6	33,3	33,2
III. Average accrual rate (%)	1,8	1,5	1,5	1,5	1,4	1,5
IV. Monthly average pensionable earnings (1000 EUR)	1,9	3,0	3,9	5,1	6,8	9,4
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	6,3	6,9	6,8	7,3	6,7	6,6
Monthly average pensionable earnings / monthly economy-wide average wage	56%	71%	70%	66%	63%	63%

Source: European Commission, EPC.
Note: The contributory period only includes working periods and excludes extra quarters (e.g. for childbearing)

3.4. Financing of the pension system

Only contributions collected on labour income, either from employer or employee side, are covered in the projections, on the basis of the contribution rates reported in Table 15. In 2021, they represented around 80% of total revenue of the pension system. The remainder of the financing is mostly made of general taxes and external transfers, reflecting a diversification of the sources of revenue of the pension system.

In the private sector, the contribution rates differ for the part of the wage below and above the Social Security ceiling (1 SSC = € 3 666 per month in 2023). In 2023, for the part below the ceiling, the total contribution rate, including the employer and the employee part, is 27.77%[17] of the gross wage; for the part above the ceiling, the rate is 26.94%. In the public sector, the contribution rate paid by employees is 11.1% of the gross wage excluding bonuses. For contributors employed in public local administrations and hospitals (covered by the CNRACL regime), the employer rate is 30.65%. The contribution rate paid by the State as an employer of civil servants remains constant at its latest legislated value (74.28% of wages excluding bonuses).

In the projection, contribution rates are kept constant at their values in January 2023, with two notable exceptions. First, the employer contribution rate in the private sector increases by 0.12 point in 2024 and by 0.09 point in 2026. Second, in the public local administration and hospital sector, the employer contribution rate increases by 1 point in 2024. These increases in contribution rates are part of the 2023 pension reform.

Based on these assumptions, public pension contributions are projected to remain fairly constant at around 11.0% of GDP between 2030 and 2070 (Table 16). Contributions from employers, employees and the State would weigh around 6.0%, 3.7% and 1.3% of GDP respectively.

The balance of the public pension system, defined as the contributions collected on labour income minus public pension expenditure, should improve from -3.3% of GDP in 2022 to -2.5% in 2070 (+0.8 pps of GDP; see Table 7 in Section 3.2). This evolution reflects the downward profile of expenditure while contributions remain broadly constant as a percentage of GDP.

The balance of the system as computed in this exercise cannot be compared to the one projected by the French pension advisory council, for two reasons. First, the resources projected here exclude revenues other than labour-income contributions; these other sources of revenue account for 20% of total resources of the public pension system. Second, disability pensions are included in pension expenditure projected in this fiche while the French pension council excludes it.

TABLE 15 – FINANCING OF THE PUBLIC PENSION SYSTEM IN 2023

In 2023, Social Security ceiling (SSC) = € 3 666 per month	Public employees	Private employees**	Self-employed
Contribution base	Gross salary excluding bonuses	Gross salary including bonuses	Non-salaried w ork-related gross income
Contribution rate/contribution	85.38% in FPE, 41.75% in CNRACL	27.77% up to one SSC and 26.94% above*****	17.75% up to one SSC and 0.6% above
Employee	11.1%	11.31% up to one SSC and 10.26% above	-
Employer	30.65% for CNRACL***	16.46%**** up to one SSC and 16.68% above	17.75% up to one SSC and 0.6% above
*State**	74.28% for FPE	-	-
*Other revenues**	not projected	not projected	not projected

**Only legislated contributions are reported.*

***First and second-pillar schemes (CNAV and AGIRC-ARRCO).*

****+1 point in 2024 as planned by the 2023 reform.*

*****+0.12 point in 2024 and +0.09 point in 2026 as planned by the 2023 reform.*

******In case the gross wage is above the SSC, the contribution rate applied on the part of the wage below the SSC is augmented by 0.35 point.*

Source: European Commission, EPC.

[17] In case the gross wage is above the Social Security ceiling, the contribution rate applied on the part of the wage below the ceiling is augmented by 0.35 point.

TABLE 16 – 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)	11,1	10,9	11,0	11,0	11,0	11,0	-0,1
Employer contributions	*5,8*	*5,9*	*6,0*	*6,0*	*6,0*	*6,0*	*0,2*
Employee contributions	*3,7*	*3,7*	*3,7*	*3,7*	*3,7*	*3,7*	*0,1*
*State contribution**	*1,6*	*1,3*	*1,2*	*1,3*	*1,3*	*1,3*	*-0,3*
*Other revenues**	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Number of contributors (I) (1000)	28708	29563	30256	30068	29686	29076	368
Employment (II) (1000)	28969	29573	30007	29992	29811	29285	316
(I) / (II)	0,99	1,00	1,01	1,00	1,00	0,99	0,0

**Includes only legislated contributions.*

Source: European Commission, EPC.

3.5. Sensitivity analysis

In order to understand the sensitivity of the baseline projections to the underlying macroeconomic and demographic assumptions, eight sensitivity tests have been carried out. They assess the impact of the assumptions on the public pension expenditure-to-GDP ratio. In addition, three specific policy scenarios have been considered to reflect the impact of deviating from the constant policy assumption applied in the baseline. Table 17 presents the sensitivity and policy scenarios in terms of deviation from the baseline.

Under the *higher life expectancy* scenario, the 2022-2070 change in public pension expenditures as a share of GDP is 0.6 point higher than in the baseline scenario. In this scenario, life expectancy at birth is 2 years higher than assumed in the baseline by 2070. Pensioners thus live longer and receive a pension for a longer period.

Under the *higher migration* scenario, the 2022-2070 change in the public pension expenditure-to-GDP ratio is expected to be 0.5 point lower than in the baseline. In this scenario, immigration is 33% higher than the baseline over the entire projection period, which boosts GDP through a higher labour force. Conversely, under the *lower migration* scenario (-33% immigration), the ratio would be 0.7 point higher in 2070 than in the baseline.

Under the *lower fertility* scenario, the public pension expenditure-to-GDP ratio is expected to be 1.2 point higher in 2070 than in the baseline. In this scenario, the fertility rate is 20% lower than the baseline during the entire projection period. The resulting smaller cohorts lead to lower labour force after the beginning of the 2040s, which dampens GDP growth.

Under the *higher inflation* scenario, the public pension expenditure-to-GDP ratio is expected to be 0.1 point lower in 2070 than in the baseline. In this scenario, the GDP deflator's growth and CPI inflation converge respectively from 2.6% and 2.5% in 2024 to the same value in 2032 (2.6%) and then to 2% in 2052. In particular, the GDP deflator evolves faster than the CPI until 2032 while, in the baseline, the two indicators reach their long-term growth target of 2% in 2027. Hence, compared to the baseline, the upward effect is higher on nominal GDP (+10.9 percentage points in 2052) than on CPI (+10.4

percentage points in 2052). As pensions are price-indexed, this results in a small reduction in the pension expenditure-to-GDP ratio as compared to the baseline. In the very long run (after 2060), the reduction is a little higher because the upward effect of a higher inflation on expenditure is transitory (as pensioners who benefited from a higher price-indexation have a finite lifetime) while it is permanent on nominal GDP.

Under the *higher employment rate of older workers* scenario, the public pension expenditure-to-GDP ratio is expected to be 0.5 point lower in 2070 than in the baseline. In this scenario, the employment rate of older workers (55-74) is increased by 10 pps over the period 2024-2036 and remain at this higher level thereafter. Pension expenditures are higher in this scenario as older workers have better careers but the increase in pensions is more than compensated by a higher GDP.

Under the *higher productivity* scenario, the public pension expenditure-to-GDP ratio is expected to be 0.4 point lower in 2070 than in the baseline. In this scenario, the TFP is the same as in the baseline until 2040 where it reaches 1%. It then remains at this level while it converges to 0.8% by 2070 in the baseline. GDP is then increasingly higher in the alternative after 2040, which has a downward effect on the expenditure ratio. Pension expenditures are also driven up by higher productivity but the effect on pensions is more gradual than on GDP due to the price-indexation of pensions.

Conversely, under the *lower productivity* scenario, pension expenditure would be 0.7 point higher in 2070 than in the baseline. In this scenario, TFP converges to 0.8% by 2040 and then to 0.6% by 2070 (instead of 1% and 0.8% for the baseline). The upward effect on the expenditure ratio is not symmetrical to the downward effect from the higher productivity scenario as GDP diverges from the baseline as of 2033 instead of 2041 in the opposite scenario.

Under the *link retirement age to longevity policy* scenario, the public pension expenditure-to-GDP ratio is expected to be 1.0 point lower in 2070 than in the baseline. In this scenario, the minimum and statutory retirement ages (64 and 67 respectively for people born as from 1968) increase in line with gains in life expectancy at 65 as from 2033, i.e. just after the legal minimum retirement age reaches 64 as planned by the 2023 reform. The reference contributory period is unchanged. In this scenario, effective retirement ages are thus higher on average compared to the baseline, resulting in lower pension expenditure through a reduction in the number of retirees.

Under the constant retirement age policy scenario, the public pension expenditure-to-GDP ratio is expected to be 0.9 point higher in 2070 than in the baseline. In this scenario, the main eligibility requirements (minimum and statutory retirement age, career requirements) are kept at their 2022 conditions over the projection period. This would drive up expenditures as the eligibility requirements are projected to be tightened in the baseline due to the 2023 pension reform.

Under the constant benefit ratio policy scenario, the public pension expenditure-to-GDP ratio is expected to be 1.9 point higher in 2070 than in the baseline. In this scenario, the benefit ratio, which expresses the average earnings-related pension benefit in terms of the average wage, is prevented from declining below 90% of its level in 2022. As the benefit ratio is projected to reach the 90% threshold in 2042 in the baseline, it is stabilised at 90% of the 2022 level as from 2042. The expenditure ratio is then higher compared to the baseline as the benefit ratio is expected to decline continuously in the baseline while it is constant in the alternative scenario.

TABLE 17 – EXPENDITURE PROJECTIONS UNDER DIFFERENT SCENARIOS (PPS DEVIATION FROM BASELINE) [18]

Public pension expenditure	2022	2030	2040	2050	2060	2070	change 2022-2070 (pps)
Baseline (%GDP)	14,4	14,3	14,1	13,7	13,5	13,6	-0,9
Higher life expectancy at birth (+2y)	0,0	0,1	0,2	0,4	0,5	0,7	0,6
Higher migration (+33%)	0,0	-0,1	-0,2	-0,4	-0,5	-0,6	-0,5
Lower migration (-33%)	0,0	0,1	0,3	0,5	0,7	0,7	0,7
Lower fertility (-20%)	0,0	0,0	-0,1	0,3	0,8	1,2	1,2
Higher inflation scenario (2% by 2052)	0,0	-0,1	0,0	0,0	-0,1	-0,1	-0,1
Higher employment rate of older workers (+10 pps)	0,0	-0,3	-0,4	-0,4	-0,4	-0,5	-0,5
Higher productivity (TFP converges to 1%)	0,0	0,0	0,0	0,0	-0,2	-0,4	-0,4
Lower productivity (TFP converges to 0.6%)	0,0	0,0	0,1	0,4	0,6	0,7	0,7
Policy scenario: link retirement age to longevity	0,0	0,0	-0,1	-0,4	-0,7	-1,0	-1,0
Policy scenario: constant retirement age	0,0	0,6	0,9	0,9	1,0	0,9	0,9
Policy scenario: constant benefit ratio	0,0	0,0	0,0	0,8	1,4	1,9	1,9

Source: European Commission, EPC.

3.6. Changes in comparison with previous Ageing Report projections

This section compares the results from the new projections with the results from the 2021 Ageing Report.

In the previous exercise, the pension expenditure-to-GDP ratio was projected to decline by 2.2 GDP points over 2019-2070, against a decrease of 0.9 GDP point over 2022-2070 in the new projections (Table 18).

The results are however not directly comparable as the time interval considered is not the same between the two exercises (2019-2070 in the previous exercise and 2022-2070 in the current one). To improve comparability, the projected changes in expenditure have been compared over a same period, namely 2022-2070. The ratio-decomposition framework developed in Section 3.3 is applied to identify the main revision factors of the projected change in expenditure. The results are shown in Figure 5.

Compared to the 2021 exercise, the new projections show a decline in public pension expenditure of 0.1 percentage point of GDP between 2022 and 2032, as opposed to an increase of 0.3 percentage point of GDP in the previous projections. In terms of evolution since 2022, the negative gap between the two projections is maximum in 2032 (-0.5 percentage point of GDP). After 2032, as the expenditure-to-GDP ratio starts decreasing in the previous projections, the negative gap narrows gradually. It becomes positive in 2044, reflecting a bigger negative change in pension expenditure in the previous exercise. Overall, the 2022-2070 negative change is smaller in the new projections (-0.9 percentage point of GDP) than in the previous ones (-2.7 percentage points of GDP). The main sources of differences between the two projections are the downward revision of labour productivity assumptions (a revision of -0.3

[18] For more information on the design of the sensitivity scenarios, see Chapter 5 of Part I in European Commission and EPC (2023), '2024 Ageing Report: Underlying assumptions and projection methodologies', European Economy, Institutional Paper 257.

percentage point per year on average over 2022-2070)[19], which has a negative impact on GDP, and, on the other hand, the effects of the 2023 pension reform.

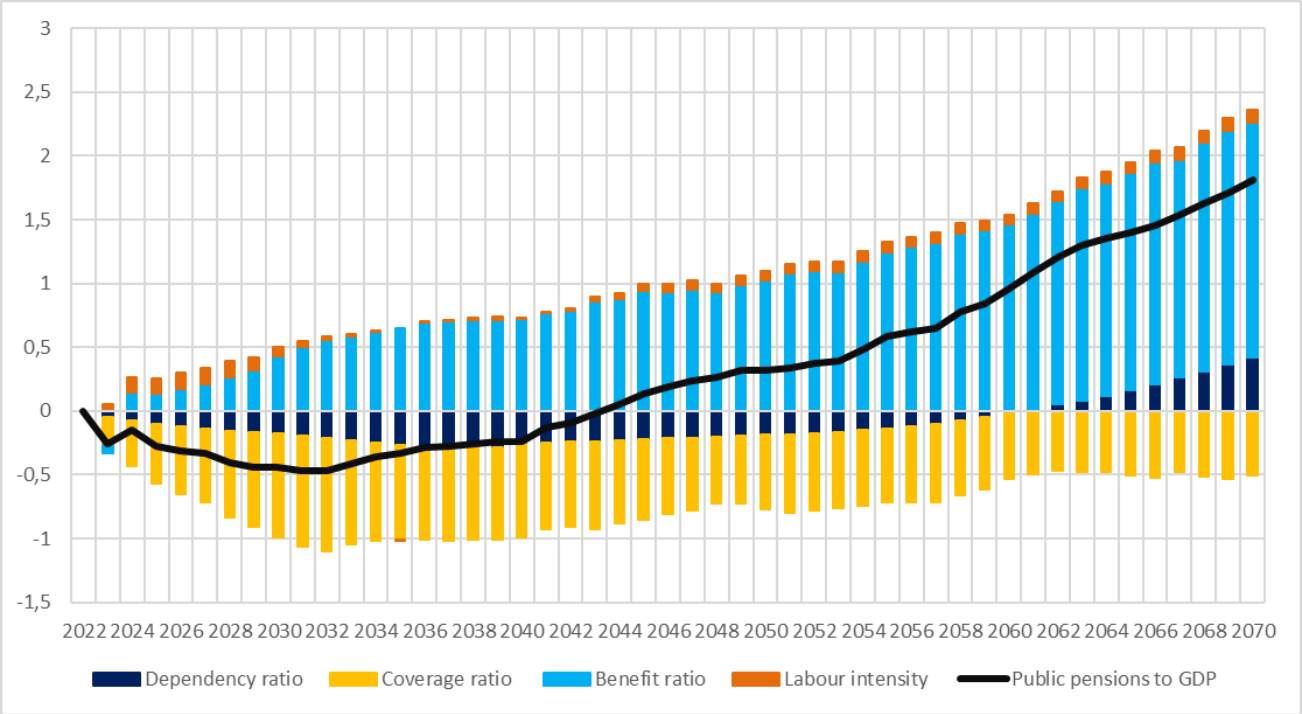
Indeed, until 2032, the opposite dynamics between the two projections mostly reflect differences in the coverage ratio (effect of -0.9 percentage point of GDP in 2032), due to the 2023 reform that mitigates the flow of new retirees in the new projections. In that period, the coverage ratio favourable effect more than offsets the downward revision of labour productivity assumptions (which accounts for +0.6 percentage point of GDP of the difference in 2032 through the benefit ratio). To a lesser extent, the reduced growth of the dependency ratio, which results from a slight downward revision of life expectancy assumptions, contributes to reducing even more the growth of pension expenditure as compared to the previous exercise (effect of -0.2 percentage point of GDP in 2032).

After 2032, the public pension expenditure-to-GDP ratio should decrease at a slower pace than in the previous exercise (-0.7 percentage point of GDP over 2032-2070 in the new projections against -3.0 percentage points in the previous ones). The difference is mainly explained by less favourable labour productivity assumptions in the new exercise (effect of +1.8 percentage points of GDP in 2070), which result in a more moderate decline in the expenditure-to-GDP ratio through a denominator effect. Besides, the negative effect of the coverage ratio on the new projections slightly reduces as the effects of the 2023 reform on retirement ages stabilise beyond 2032. More generally, the 2023 reform explains part of the flatter downward trend of the new projections. Indeed, part of the overall 2022-2070 projected reduction in pension expenditure would already be achieved by 2032 thanks to the reform, and thus the downward trend is less steep.

After 2060, the new projections should deviate even more from the previous ones due to lag effects of the downward revision in fertility rates over the projection period which moderates the population of the 20-64 relative to the 65+ in the long run. This is reflected in a positive effect of the dependency ratio at the end of the projection period.

[19] See Table I.3.9 of Volume 1 of the 2024 Ageing Report.

FIGURE 5 – DECOMPOSITION OF THE CHANGE IN PENSION EXPENDITURES BETWEEN THE 2021 AND THE 2024 EXERCISES (% GDP)



How to read the graph: Between 2022 and 2070, the evolution of the dependency ratio explains, ceteris paribus, 0.4% point of GDP of the upward revision of the evolution of the public pension expenditure-to-GDP ratio since the last projection exercise.
Source: French Treasury's calculations based on INSEE simulated data.

TABLE 18 – DISAGGREGATION OF THE CHANGE IN THE PUBLIC PENSION EXPENDITURE-TO-GDP RATIO IN CONSECUTIVE AGEING REPORTS (PPS OF GDP)

	Public pension expenditure	*Dependency ratio effect*	*Coverage ratio effect*	*Benefit ratio effect*	*Labour market effect*	*Residual (incl. interaction effect)*
2006 Ageing Report (2004-2050)	**2,0**	*8,7*	*-1,8*	*-3,5*	*-0,9*	*-0,5*
2009 Ageing Report (2007-2060)	**1,0**	*8,4*	*-2,2*	*-4,0*	*-0,5*	*-0,7*
2012 Ageing Report (2010-2060)	**0,5**	*9,1*	*-3,5*	*-3,1*	*-1,2*	*-0,8*
2015 Ageing Report (2013-2060)	**-2,8**	*6,7*	*-3,2*	*-4,7*	*-1,2*	*-0,4*
2018 Ageing Report (2016-2070)	**-3,3**	*6,2*	*-2,9*	*-4,8*	*-1,4*	*-0,3*
2021 Ageing Report (2019-2070)	**-2,2**	*7,1*	*-2,0*	*-5,9*	*-1,0*	*-0,4*
2024 Ageing Report (2022-2070)	**-0,9**	*6,0*	*-2,2*	*-3,4*	*-1,0*	*-0,3*

- 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.

Table 19 compares the projections of the 2021 Ageing Report with actual public pension expenditure between 2019 (the previous base year) and 2021 (the year preceding the new base year) as reported in the Social Protection Account of the French Ministry of Social Affairs. The difference is largely due to the assumptions underlying the previous projections and how these diverged from reality. More specifically, real GDP was underestimated in the previous round.

TABLE 19 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 PROJECTIONS AND ACTUAL PUBLIC PENSION EXPENDITURE IN 2019-2021 (% GDP)

	2019	2020	2021
Ageing Report 2021 projections (%GDP)	14,8	16,2	15,3
Assumptions (pps of GDP)	-0,1	-0,5	-0,6
Coverage of projections (pps of GDP)	-0,1	0,0	0,0
Constant policy impact (pps of GDP)	0,0	0,0	0,0
Policy-related impact (pps of GDP)	0,0	0,0	0,0
Actual public pension expenditure (%GDP)	14,5	15,7	14,7

Source: European Commission, EPC; Social Protection Account, French Ministry of Social Affairs.

Table 20 provides the same kind of disaggregation of the difference between the 2024 and the 2021 Ageing Report projections.

On average over 2022-2070, the change in assumptions is the main revision factor between the two projection exercises (Table 20). It has a negative impact on the expenditure-to-GDP ratio until the end of the 2050s and a positive impact thereafter. Hence, despite the downward revision of labour productivity assumptions, the impact is negative for a great part of the projection period due to a substantial upward revision to the level of real GDP in the years before the beginning of the projections (+7.4% in 2016). For this reason, the real GDP level remains higher in the 2024 than in the 2021 Ageing Report until the beginning of the 2050s. Apart from the macroeconomic assumptions, the change in demographic assumptions has an effect on the revision whose sign changes over time: until the end of the 2050s, the effect is negative through an upward revision of mortality assumptions; thereafter, the effect is positive due to lag effects of the downward revision in fertility over the whole projection period.

The improvement in the modelling has a more moderate impact on the revision of the expenditure-to-GDP ratio. It is positive until the end of the 2030s and negative thereafter. Compared to the previous exercise, the model now uses more recent data to initialise the projections, which improves the modelling in the first years of the projections. More specifically, in the previous round, the initial data that fed into the model dated back to 2009, which means that the projections actually began in 2010. In particular, individual career's paths had to be simulated as from 2010. For the current exercise, the model has been upgraded to the 2018 version of the initial database used in the 2021 Ageing Report (which used the 2009 version). This means that individual paths are now observed until 2018 (against 2009 in the previous version) rather than simulated; consequently, the gap between the beginning of the projections (2009 in the previous version of the model against 2018 in its new version) and the base year of the Ageing Report projections has been reduced (from 10 years to 4 years). In particular, career's paths of older workers now better reflect reality in the first years of the projections.
Besides, new data on pension expenditure between 2019 and 2021 have been used to improve the current projections, which generates some differences with the previous exercise.

The change in the interpretation of constant policy has an impact which is below 0.1 GDP point before 2040 and above thereafter. In the current projections, the non-contributory minimum pension is indexed to prices until 2032, which is the standard indexation as stipulated by legislation, and to wages thereafter. In the previous projections, it was indexed to wages only as of 2063. As nominal wages evolve faster than prices, the constant policy factor has a positive effect on the revision.

The impact of policy-related changes is mostly concentrated before 2040. It is positive in 2022 (+0.2 GDP point) due to the anticipated price-indexation of 4% for the first-pillar old-age pensions in July 2022 instead of January 2023. This measure has an impact only in 2022 since the indexation applied in January 2023 was only an adjustment to fully account for inflation in 2022. The impact is then negative over 2023-2040 as the 2023 pension reform is expected to reduce pension expenditure through a gradual rise in the legal retirement age and in the contributory period. It reaches a maximum in 2032

when the legal retirement age reaches its target value (64). The impact then decreases as the average effective retirement age would have increased without the 2023 reform due to later entries into the labour market and the 2014 reform that increases the contributory period. In the very long run, the impact should be close to zero as the reduction in the number of retirees due to the 2023 reform would be counterbalanced by higher pension benefits.

TABLE 20 – DISAGGREGATION OF THE DIFFERENCE BETWEEN THE 2021 AND THE NEW PUBLIC PENSION PROJECTIONS (% GDP)

	2022	2030	2040	2050	2060	2070
Ageing Report 2021 projections	15,3	15,6	15,2	14,3	13,4	12,6
Change in assumptions (pps of GDP)	-1,1	-0,9	-0,5	-0,3	0,1	0,9
Improvement in the coverage or in the modelling (pps of GDP)	0,1	-0,1	-0,5	-0,4	-0,2	-0,2
Change in the interpretation of constant policy (pps of GDP)	0,0	0,0	0,0	0,1	0,2	0,2
Policy-related changes (pps of GDP)	0,2	-0,3	-0,1	0,0	0,0	0,0
New projections	14,4	14,3	14,1	13,7	13,5	13,6

Source: European Commission, EPC.

4. Description of the pension projection model and the base data

4.1. Institutional context in which the projections are made

Old-age and early pensions and survivor pensions have been projected using the dynamic microsimulation model Destinie. Destinie is a model developed since the mid-1990s and run by the French statistical office (INSEE – *Institut national de la statistique et des études économiques*). As for the 2021 Ageing Report, the French Treasury has worked in close cooperation with INSEE during the projection exercise.

The Destinie model is regularly reviewed by INSEE through internal seminars, and also during the workshops held by the French pension advisory council (COR – *Conseil d'orientation des retraites*). Destinie is a reference in the field of microsimulation models for pension projections. It has been used for scientific studies whose results have been published in institutional publications[2021] as well as peer-reviewed journals.[2223] It has also been used for public and official reports.[24]

A pension projection exercise similar to the one conducted by the AWG is done on a yearly basis at the national level by the COR. Compared to the AWG, the scope excludes disability pensions. A comparison of the results presented in this fiche and the ones published by the COR in June 2023 is provided in Annex A.

As regards disability pensions, the projection model is the same as the one used for the 2021 Ageing Report. It is a macrosimulation model developed by the French Treasury.

4.2. Data used to run the model

The initial data used to run the projections is a sample of about 62,000 individuals extracted from the 2017-2018 edition of the Household Wealth Survey conducted by INSEE (*Enquête Histoire de Vie et Patrimoine 2017-2018*). This initial data contains information on, among other things, education (diploma and graduation age), status in the labour market (past and until 2018: inactive, unemployed, employed either in private or public sector, etc.) and family ties. As marital ties are modelled, the model can simulate survivor pensions. During the extraction process from the HWS, other external data sources (Labor Force Survey, Census Survey, Demographic Report, etc.) have been used to align the initial data to observed data along several characteristics:

- Single age
- Distribution of level of education
- Distribution of type of household
- Participation rate and unemployment rate by gender and age group
- Share of public and private sector employees as well as self-employed

[20] Bachelet, M., A. Leduc, A. Marino, « Les biographies du modèle Destinie II : rebasage et projection », Working paper n° G2014/01, Direction des Etudes et Synthèses Economiques, February 2014.
[21] Marino, A., « Vingt ans de réformes des retraites : quelle contribution des règles d'indexation ? », Insee Analyses n°17, April 2014.
[22] Blanchet, D., S. Buffeteau, E. Crenner and S. Le Minez, « Le modèle de microsimulation Destinie 2 : principales caractéristiques et premiers résultats », *Economie et Statistique n°441-442*, October 2011.
[23] Bachelet, M., M. Beffy, D. Blanchet, « Projeter l'impact des réformes des retraites sur l'activité des 55 ans et plus : une comparaison de trois modèles », *Economie et Statistique n°441-442*, October 2011.
[24] Rapport de la Commission Moreau pour l'avenir des retraites, « Nos retraites demain : équilibre financier et justice », June 2013.

4.3. Reforms incorporated in the model

This section details some other pension reforms in addition to those described in Section 1.2.

- The 2003 reform:

  - It planned to semi-automatically increase the contribution period necessary to draw a full pension in line with gains in life expectancy. The aim was to keep the ratio between contribution period and average length in retirement constant at its value of 2003 (1.79). In application of that principle, the reference contribution period has increased from 40 years for the cohort born in 1948 to 41.5 years for the 1957 cohort. This mechanism has been replaced by the 2014 reform.
  - It introduced the possibility for people with long careers to retire early and scheduled an increase of the minimum earnings-related pension. The early retirement arrangement for long careers concerns people who started to work before the age of 16 or 20 and who have contributed longer than the reference contribution period. They are entitled to withdraw their pension up to 4 years before the legal retirement age (56 years old).
  - A bonus system was introduced for people who delay their retirement although they have reached the minimum retirement age and met the reference contribution period condition. The penalty for early-retirement was gradually decreased from 10% to 5% of the pension benefit for private sector workers and was introduced for public sector workers. The reform also introduced the possibility of cumulating a pension and a wage and fostered the development of occupational and voluntary private savings through fiscal incentives.
  - Several measures specific to the public sector were adopted in order to facilitate a gradual convergence with the general scheme: (i) an increase in the contribution period required to draw a full-rate pension (from 37.5 to 40 years), (ii) the introduction of a bonus/penalty system converging gradually to the one existing in the general scheme, and (iii) the introduction of a complementary scheme (RAFP).

- The 2008 "rendez-vous":

  - The bonus for extra periods worked after the minimum retirement age and above the required contribution period was raised to 1.25% per quarter;
  - The possibility of drawing a pension and a wage simultaneously was fully liberalized for people entitled to a full pension;
  - Employers were encouraged to reach quantitative targets for senior workers' employment and discouraged to use retirement as a substitute for layoff.
  - The contributory minimum pension in the general scheme has become means-tested in order to target people with a low level of total pension (including the other first-pillar pensions and the second-pillar pension) more effectively.

- The 2010 reform contained several measures aimed at both curbing expenditures and raising revenues:

  - It introduced a progressive two-years rise of both the minimum retirement age and the statutory retirement age (or full-pension age). The earliest retirement age was gradually increased, for all

pension schemes, from 60 to 62. Simultaneously, the full-pension age went up from 65 to 67. The age boundaries rose gradually between the cohort born in July 1951 and the cohort born in 1955, by a step of 4 or 5 months.[25] For example, people born in 1956 can claim their pension at age 62 in 2018 and a full pension at 67 in 2023 whatever their contributory period. The early retirement age for long careers has also been increased by 2 years.

- Exceptions related to fragile workers have been introduced. Some categories of workers are still being granted a full pension at 65 (disabled, mother of 3 children), and people suffering from a professional disease or an accident that resulted in a permanent incapacity of at least 20%[26] can still retire at 60 with a full pension. The retirement for long careers is extended to people who started to work before 18; they can retire at age 60 under certain conditions.
- The convergence of pension rules between public and private sectors was strengthened by the decision to remove the possibility of early retirement for parents with 3 children and a 15 year-career in the public sector and the "Cessation Progressive d'Activité" programme in the public sector as well. The contribution rate of civil servants[27] will also converge towards the private sector rules.

- The 2014 reform contained several short-term measures: an increase in social contribution rates by 0.3 point for employees and employers between 2013 and 2017, the removal of the 10% tax exemption on the pension bonus for pensioners with 3 children or more, a change in the date of the annual indexation of pensions from April to October. The reform also contained several long-term measures:
  - It introduced a progressive rise of the reference contribution period for a full pension before the age of 67 to 43 years (reached in 2035). This rule replaces the mechanism introduced by the 2010 reform and affect all pension schemes;
  - In order to strengthen the governance of the pension system, a steering committee has been established and has been entrusted with the task of publishing a yearly report on the French pension system. It will make recommendations if there are significant discrepancies with respect to the objectives assigned to the pension system by the law.
- In July 2017, the LURA reform (LURA stands for Liquidation Unique de retraite de base des Régimes Alignés) entered into force. Before the reform, private sector workers who had contributed to several first-pillar schemes over their career (CNAV, MSA salaries or SSI) used to receive as many pensions as schemes they had contributed to and each pension was calculated separately. Since July 2017, individuals who are in such a situation[28] receive only one pension calculated according to one single benefit formula.
  - The reference wage is the average over the 25 best annual wages (valorised in line with inflation) across the entire career whatever the regime (CNAV, MSA or SSI). The total number of quarters validated in a given a year cannot exceed four.

[25] Initially, a 4-month increase per cohort was planned between the 1951 cohort and the 1956 cohort but the 2012 social security budget law accelerated the increase to 5 months per cohort.

[26] 10% under specific disability conditions.

[27] The contribution rate for civil servants, applied to the gross wage excluding bonuses, was planned to increase from 7.85% to 11.10% by 2020.

[28] The reform does not affect individuals who had already retired before July 2017

The LURA arrangement was part of the 2014 reform but the executive order related to its implementation was published only in May 2017.

- Between 2019 and 2022, pensions in the AGIRC-ARRCO second-pillar scheme were indexed following discretionary decisions: pensions were indexed to prices in 2019 and in 2021, frozen in 2020 and indexed to wages in 2022.

- In addition, the non earnings-related minimum pension (ASPA) has been increased by €100/month between 2018 and 2020 (from €803/month in early 2018 to €903 in 2020), reflecting a discretionary increase above the standard price-indexation. Likewise, the adult disability allowance (AAH), standing at €819 in early 2018 was increased to €903 by 2020.

4.4. General description of the model(s)

Old-age and survivor pensions: the Destinie model

The Destinie model is a dynamic microsimulation model made of three blocks: a demographic block, a career block and a retirement block. A detailed description of the model can be found on this link.

For each individual, the demographic block simulates several demographic events (date of birth/death, marriage, separation, birth of children, migration and schooling duration).

The career block projects professional statuses in the labour market (inactive, unemployed, employed either in private or public sector, etc.) and wages.

The retirement block computes the retirement age and the pension benefit (old-age and survivor).

In the demographic and career blocks, events are simulated on an annual step based on several equations estimated on external observed data. For instance, for each individual, the annual wage depends, among other parameters, on the schooling level and seniority. Besides, simulations are aligned on several exogenous targets related to different indicators (mortality rates, migration, number of births, participation and unemployment rate, productivity growth, etc.).

As individual biographies (demographic and professional) are observed until 2018, the demographic and career blocks start in 2018.

Disability pensions

The model used for disability pension projection is a macrosimulation model. It can be compared to those used for health care and long-term care expenditure projections. The methodology is articulated as follows:

- STEP 1: measure of the age/gender ratio of recipients and age/gender average amount of disability benefits (ATMP pensions, PI and AAH) on the latest available dataset.

- STEP 2: calculate number of recipients for each projection year up to 2070 by multiplying the ratio of recipients by the population by age and gender provided by Eurostat.

- STEP 3: multiply the average amount of disability benefits per age/gender on the basis of an indexation assumption.

- STEP 4: multiply the projected average amount of disability benefits by the projected number of recipients to obtain total projected expenditure on disability pensions.

4.5. Other features of the projection model

Old-age and survivor pensions: the Destinie model

Number of different persons modelled per generation: The sampling rate of the model is close to 1/1000. Between 700 and 900 individuals are modelled per cohort.

Career modelling: professional trajectories are projected until 2070 according to transition matrices estimated on external observed data. For each individual, a decision tree is computed which depends on the current status in the labour market. A specific procedure ensures that simulated transitions reflect the assumptions related to labour force (participation and unemployment rates).

Retirement age calculation: In the model, retirement decisions are simulated for future retirees but also for individuals who retired before the beginning of the projections (2018). In both cases, individuals are assumed to retire once they are eligible to a full-rate pension. Retirement may thus occur before the legal minimum retirement age (under the "long career" scheme), between the minimum and the statutory retirement age (provided the contributory period condition is met) or at the statutory retirement age (the age at which a full-rate pension is granted whatever the career length). Disability pensioners can benefit from a full-rate old-age pension once they reach the legal minimum retirement age.

Methodological annex

Economy-wide average wage at retirement

The economy-wide average wage at retirement evolves mostly in line with labour productivity growth. To a lesser extent, the rise in effective retirement ages also leads to higher average wage at retirement through seniority.

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

	2022	2030	2040	2050	2060	2070
Economy-wide average gross wage at retirement	43,1	55,6	75,2	115,6	156,3	231,5
Economy-wide average gross wage	40,0	50,2	66,3	93,1	129,6	179,2

Source: European Commission, EPC.

Pensioners vs pensions

The ratio of pensions over pensioners is constant at 1.3 over the projection period.

Disability pensioners

Spending on disability pensions is projected to decrease from 1.0% in 2022 to 0.9% of GDP in 2070 (see Section 3.2).

The assumptions behind this evolution are the following:

- The number of disability pensioners by gender and single age are observed in 2021 from administrative data. The projected number of pensioners between 2022 and 2070 are obtained through a combination

of ESTAT population projections by gender and single age and the disability rates observed in 2021. Disability rates by age group are thus assumed to remain constant throughout the projection period.

- For each component of the disability pension (AAH, ATMP and PI), the average benefit by gender and single age is estimated from observed data in 2021. Between 2022 and 2070, the average ATMP and PI benefits are assumed to evolve like the economy-wide average wage, and the average AAH benefit like CPI.

The PI component of disability pensions is transformed into old-age benefits when the minimum legal retirement age is reached (62 for the cohorts born between 1955 and 1960). The 2023 pension reform has maintained the legal minimum old-age retirement age for disability pensioners at 62. This means that, as before the reform, the PI component of disability pensions is replaced by an old-age pension once pensioners reach 62. Hence, the 2023 reform does not affect the disability pension expenditure related to the PI component. Yet, it may modify the disability rates above 62 as the rise in the minimum retirement age from 62 to 64 may result in a higher risk of being disabled through the prolongation of working period. This feature has not been taken into account in the projections.

TABLE A2 – DISABILITY RATES BY AGE GROUPS (%)

	2022	2030	2040	2050	2060	2070
Age group -54	3%	3%	3%	3%	3%	3%
Age group 55-59	13%	13%	13%	13%	13%	13%
Age group 60-64	10%	10%	10%	10%	10%	10%
Age group 65-69	5%	5%	5%	5%	5%	5%
Age group 70-74	5%	5%	5%	5%	5%	5%
Age group 75+	5%	5%	5%	5%	5%	5%

Source: French Treasury.

Survivors' pensions

Survivor pensions, as a share of GDP, are expected to decline from 1.5% in 2022 to 1.0% of GDP in 2070 (see Section 3.2). Three main factors reflect this downward evolution:

- The reduction of the gender gap in life expectancy. As most beneficiaries of survivor pensions are women (88% in 2021), it should reduce the period in which survivor pensions are received and thus the number of beneficiaries per year.

- The rise of female participation rates. Survivors' pensions are means-tested in the first-pillar scheme for private sector employees: due to the improvement of women's careers, fewer women are expected to meet the means condition for being eligible to a survivors' pension in the future, and, for those eligible, the amount received should be lower as their old-age benefits are higher.

- The downward trend of marriage rate. It reduces the number of people eligible to a survivor pension as only married people can benefit from a survivor pension.

Non-earnings-related minimum pension

Throughout the projection period, the take up rate of the non-contributory minimum pension (ASPA) is kept constant at the value that prevailed in 2021.[29] The expenditure projections for this item are described in Section 3.2.

Contributions

The implicit contribution rates (total contributions relative to the economy-wide gross wage total) remain broadly constant over the projection period, between 24.6% and 24.9% of total gross wage. Small variations may reflect changes (i) in the share of public sector employees in total employment as the contribution rates differ between the public and the private sector, and (ii) in the share of total wages above the Social Security ceiling in the private sector as the contributions rates also differ below and above the ceiling.

Besides, as planned by the 2023 pension reform, the contribution rates are assumed to increase in 2024 and 2026 (see Section 3.4 for more details). This might induce some small variations in the implicit contribution rate.

Alternative pension spending disaggregation

Table A3 is similar to Table 9 but provides a disaggregation of the change in pension expenditure based on the number of pensions as compared to the number of pensioners in Table 9.

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

	2022-30	2030-40	2040-50	2050-60	2060-70	2022-70
Public pensions to GDP	-0,1	-0,2	-0,4	-0,2	0,1	-0,9
Dependency ratio effect	1,8	2,0	0,8	0,5	0,7	5,8
Coverage ratio effect*	-1,0	-0,6	0,1	0,0	-0,1	-1,5
Coverage ratio old-age	-0,2	-0,1	0,1	0,0	0,0	-0,1
Coverage ratio early-age	-2,6	-1,6	0,4	-0,2	-0,4	-4,3
Cohort effect	-2,0	-2,0	-0,8	0,1	-0,6	-5,3
Benefit ratio effect	-0,3	-1,1	-1,0	-0,7	-0,5	-3,6
Labour market effect	-0,3	-0,5	-0,2	0,0	0,0	-1,0
Employment ratio effect	-0,3	-0,4	-0,2	0,0	0,0	-0,9
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	0,0	-0,1	0,0	0,0	0,0	-0,2
Residual	-0,4	-0,1	0,0	0,0	0,0	-0,5

Source: European Commission, EPC.

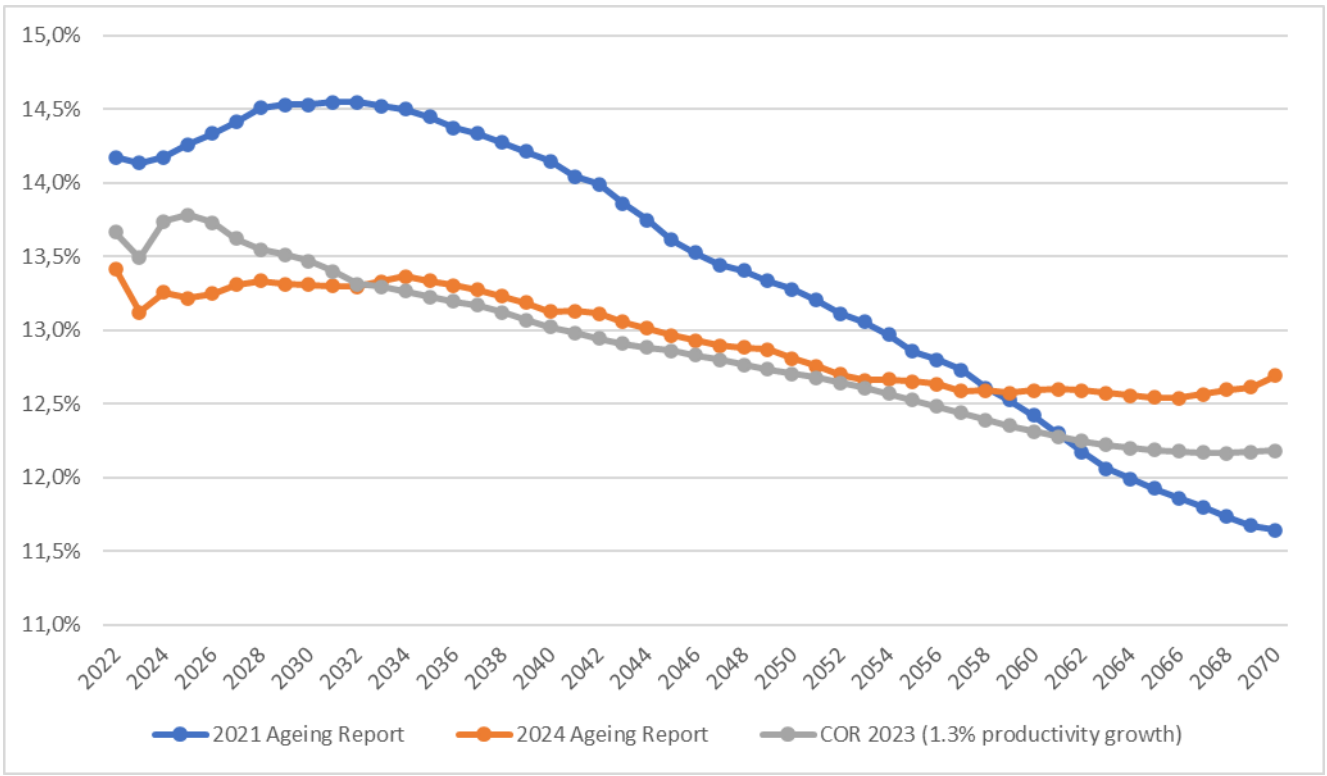
[29] According to a study by the French Ministry of Social Affairs, the take up rate was around 50% in 2016 for pensioners living alone.

Annexes

A. Comparison with the COR projections released in June 2023 (1.3% productivity growth scenario)

The projection exercise conducted by the French pension advisory council (COR – *Conseil d'orientation des retraites*) in June 2023 shows a slightly higher reduction in the expenditure-to-GDP ratio (excluding disability pensions) by 2030: under the 1.3% productivity growth scenario (the closest to the baseline), expenditure is expected to decrease by 0.2% point of GDP in COR against 0.1% in the 2024 Ageing Report (see Figure 6). By 2070, the reduction in the expenditure ratio would be higher in the COR projections than in the 2024 Ageing Report (-1.5 GDP point in COR versus -0.7 in the Ageing Report, hence a 0.8 GDP point difference). The lower expenditure reduction in the 2024 Ageing Report is due to less favourable labour productivity assumptions (+1.2%/year on average against +1.3%/year in COR) and higher unemployment (6.6% vs 4.5% in the long run), which dampens GDP growth. Towards the end of the projection period, the differences between the two projections become larger due to a more pronounced ageing in the 2024 Ageing Report (higher female life expectancy by one year in 2070 compared to the COR assumptions).

FIGURE 6 – EXPENDITURE-TO-GDP RATIO IN THE 2021 AGEING REPORT, THE 2024 AGEING REPORT AND THE COR PROJECTIONS RELEASED IN JUNE 2023 (DISABILITY PENSIONS EXCLUDED)



Source: French Treasury calculations based on Insee simulated data; COR (June 2023 Annual Report)

B. Breakdown of new public pension expenditure (old-age and earnings-related pensions) – Point system schemes

TOTAL	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	1995,1	2314,1	4288,1	5294,8	8678,3	10912,3
Number of new pensions (1000)	686,5	619,2	757,5	721,4	901,7	916,2
Point value (EUR/month)	0,1	0,1	0,2	0,2	0,2	0,3
Average accrual rate (points/year; a/b)	163,6	175,9	210,0	222,9	205,4	204,7
a. Average pension points at retirement	4540,9	4562,5	5751,0	5803,6	5829,1	5871,4
b. Average contributory period (years)	27,8	25,9	27,4	26,0	28,4	28,7
Sustainability/adjustment factors	1	1	1	1	1	1
Correction coefficient (1 if not applicable)	0,9	0,9	0,9	0,9	1,0	0,9
Average number of months paid the first year	6,6	6,7	7,0	7,4	7,2	7,3

MEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	1307,8	1238,2	2211,9	2902,3	5333,2	7044,7
Number of new pensions (1000)	322,2	297,0	351,1	336,6	446,1	474,9
Point value (EUR/month)	0,1	0,1	0,2	0,2	0,2	0,3
Average accrual rate (points/year; a/b)	194,3	213,0	241,3	255,2	238,8	235,8
a. Average pension points at retirement	6199,6	5267,2	6586,8	6964,1	6990,9	7061,7
b. Average contributory period (years)	31,9	24,7	27,3	27,3	29,3	30,0
Sustainability/adjustment factors	1	1	1	1	1	1
Correction coefficient (1 if not applicable)	0,8	0,9	0,9	0,8	0,9	1,0
Average number of months paid the first year	7,0	6,5	7,0	7,6	7,6	7,5

WOMEN	2022	2030	2040	2050	2060	2070
Projected new pension expenditure (million EUR)*	687,3	1076,0	2076,2	2392,5	3345,1	3867,6
Number of new pensions (1000)	364,3	322,2	406,4	384,7	455,7	441,2
Point value (EUR/month)	0,1	0,1	0,2	0,2	0,2	0,3
Average accrual rate (points/year; a/b)	127,6	144,7	183,2	192,1	170,6	168,0
a. Average pension points at retirement	3073,7	3913,1	5029,0	4788,2	4691,8	4590,4
b. Average contributory period (years)	24,1	27,0	27,5	24,9	27,5	27,3
Sustainability/adjustment factors	1	1	1	1	1	1
Correction coefficient (1 if not applicable)	0,9	0,9	0,9	0,9	1,0	0,9
Average number of months paid the first year	6,3	6,9	7,0	7,2	6,8	7,1

C. Minimum legal retirement age and full-pension age in the French pension system

Year of birth	Minimum legal retirement age	Full-pension age*
Before July 1st 1951	60	65
July 1st-Dec 31th 1951	60 and 4 months	65 and 4 months
1952	60 and 9 months	65 and 9 months
1953	61 and 2 months	66 and 2 months
1954	61 and 7 months	66 and 7 months
Jan 1st 1955 - Aug 31th 1961	62	67
Sep 1st - Dec 31th 1961	62 and 3 months	67
1962	62 and 6 months	67
1963	62 and 9 months	67
1964	63	67
1965	63 and 3 months	67
1966	63 and 6 months	67
1967	63 and 9 months	67
1968 and after	64	67

**for the private sector general scheme*

D. Contributory period required for a full-rate pension (general case)

Year of birth	Contributory period required for a full pension (in years)
1948 and before	40
1949	40 years and 3 months
1950	40 years and 6 months
1951	40 years and 9 months
1952	41 years
1953 and 1954	41 years and 3 months
1955 to 1957	41 years and 6 months
1958 to 1960	41 years and 9 months
Sep 1st - Aug 31th 1961	42 years
Sep 1st 1961 to 1962	42 years and 3 months
1963	42 years and 6 months
1964	42 years and 9 months
1965 and after	43

E. Parameters for the long-career scheme (for cohorts born in 1970 and after)

Earliest retirement age		58	60	62	63
Required contribution period (in years)		43	43	43	43
Starting career conditions	nb of quarters required	4 or 5*	4 or 5	4 or 5	4 or 5
	before the end of the civil year of	16	18	20	21

*: 4 quarters if born in the last quarter of the civil year, 5 quarters otherwise
Lecture note: Someone born in 1970 who starts working at 18 and has a continuous career path can retire at 62 after.
Source: French Treasury based on legislation.

F. Glossary

CNAV: Caisse nationale d'assurance vieilesse

AGIRC: Association générale des institutions de retraite complémentaire des cadres

ARRCO: Association pour le régime de retraite complémentaire des salariés

IRCANTEC: Institution de retraite complémentaire des agents non titulaires de l'État et des collectivités publiques

MSA: Mutualité Sociale Agricole

FPE: Fonction publique d'Etat

RAFP: Retraite additionnelle de la fonction publique

CNRACL: Caisse nationale de retraites des agents des collectivités locales

RATP: Régie autonome des transports parisiens

SNCF: Société nationale des chemins de fer

CNIEG: Caisse nationale des industries électriques et gazières

SSI: Sécurité sociale des indépendants

CNAVPL: Caisse nationale d'assurance vieillesse professions libérales

CNBF: Caisse nationale des barreaux français

RCI: Retraite complémentaire des indépendants

FPT : Fonction publique territoriale

FPH : Fonction publique hospitalière