MINISTÈRE
DE L'ÉCONOMIE,
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Liberté
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PENSION PROJECTIONS FOR THE 2021 AGEING REPORT

COUNTRY FICHE

FRANCE

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RÉPUBLIQUE FRANÇAISE

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1. Overview of the pension system

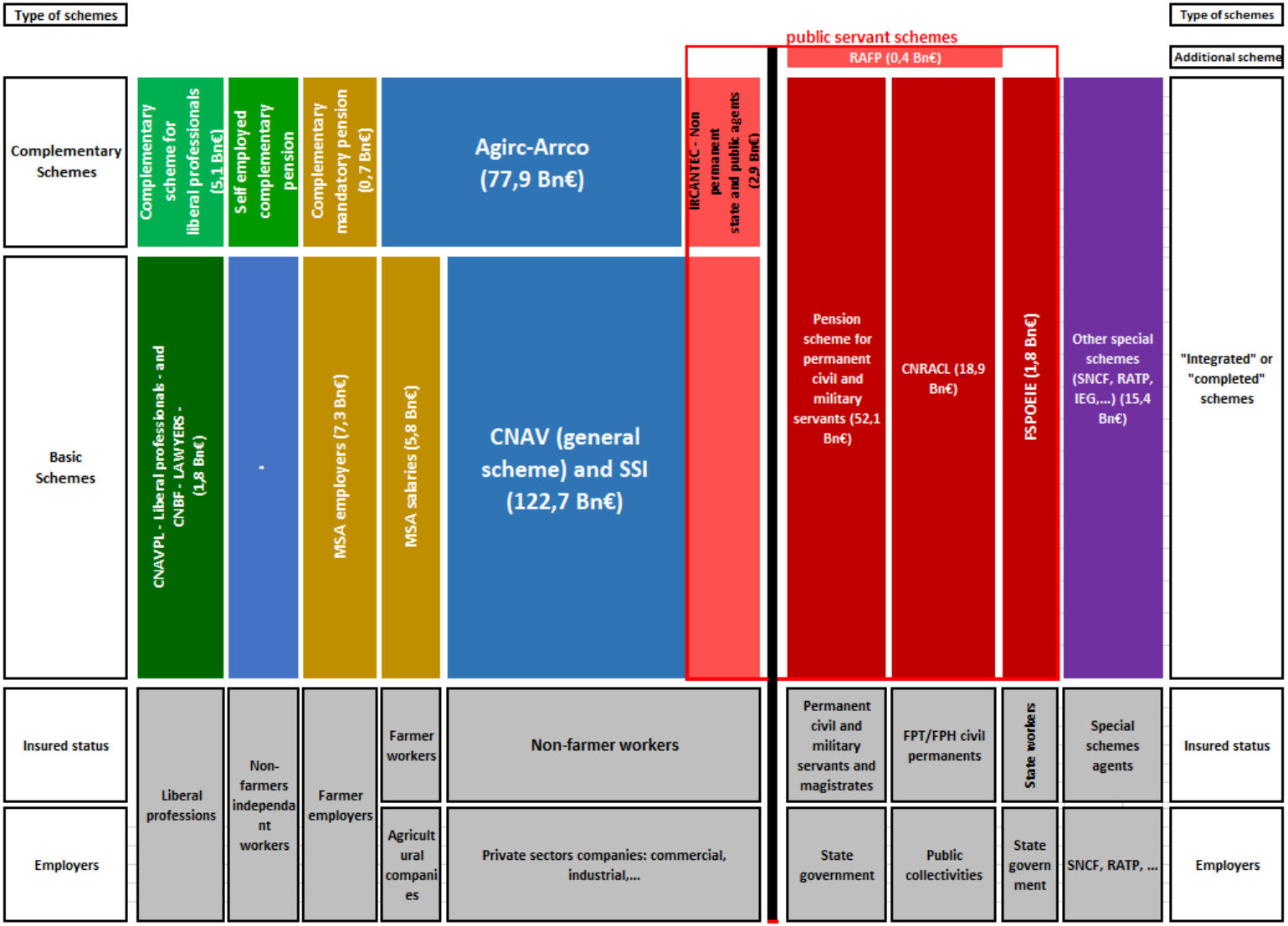
1.1. Description

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

The French pension system is essentially a pay-as-you-go 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 2020.

The French pension system is based on several schemes depending on the professional sector or occupational status. The private sector employees scheme (CNAV) is the largest one. These schemes follow different rules. All workers are affiliated, according to their profession, at the same time to a basic and a mandatory complementary scheme. They can belong to several basic schemes during their career: they then receive several pensions at retirement.

Table 1.1 - Outline of the French pension system



Note: Regarding acronym developments, please refer to the glossary.

**Self-employed workers (artisans and retailers), affiliated to the Social Regime for the Self-Employed (Régime Social des Indépendants - RSI) until December 31, 2017, are affiliated to the Social Security for the Self-Employed (Sécurité Sociale des Indépendants - SSI) from January 1, 2018, whose management is gradually assumed by the French National Old Age Insurance Fund (Caisse Nationale d'Assurance Vieillesse - CNAV).*

Special Schemes

Within the special pension schemes, there are three families:

- The special civil service scheme (civil and military servants) ;
- The regime for companies and public establishments ;
- Other schemes grouped around a profession or company.

The main special schemes include :

- The scheme for civil servants, magistrates and military personnel covered by the Civil and Military Retirement Pensions Code ;
- The SNCF's scheme with the SNCF provident and pension fund ;
- The scheme for Clerks and Notary Employees with the Pension and Welfare Fund for Clerks and Notary Employees ;
- The RATP's scheme with the RATP staff pension fund ;
- The Seamen's regime with the National Establishment for the Invalids of the Navy ;
- The EDF-GDF Electricity and Gas Industries scheme with the National Fund for Electricity 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 Banque de France regime.

Special schemes represent about 4.5 million pensioners, i.e. 25.7% of French pensioners and 4.7 million contributors, i.e. 3.4% of the labour force.

Special schemes workforce	Contributors	pensioners
Civil and military servants	2 058 000	2 355 000
Territorial and medical civil servants	2 223 000	1 155 000
Sate-owned industrial civil servants	35 772	103 682
Electricity and gas industries	146 103	164 895
SNCF	142 943	261 033
RATP	42 483	44 316
Clerks and Notary Employees	47 618	73 090
Seamen's	20 045	117 830
Banque de France	12 029	14 891
The mining regime	3 401	303 970
Paris National Opera	1 825	1 999
French Comedy	350	401

Retirement age

The retirement age depends on the behaviour of the new pensioners. There is a legal minimum age[1] and incentives to retire later.

- People can retire when they reach the earliest retirement age (62 for the 1955 generation and the following ones), with a penalty if they do not meet the required contribution period condition (43 years from the 1973 generation onward).
- They can also delay their entry into retirement in order to obtain a full pension which is granted for people with the required contribution period or above the statutory retirement age (also called full pension age, 65 up to the 1951 generation, 67 for generations born in 1955 and after). People who are allowed to retire with a full pension (as they meet the age and contribution period conditions) but who decide to keep working will receive a bonus on their pension proportional to the number of extra years worked.

There are some exceptions to the legal retirement age. The most important one is dedicated to people who have started working at a very young age and have validated more than the required time (see details infra). In the public sector, for some special branches among "active service" (policemen, nurses, etc.), the minimum retirement age is 57 years old[2]. In general, there is no gender difference in the eligibility requirements.

Table 1.2 – Qualifying conditions for retirement

		2020	2030	2040	2050	2060	2070
20 contribution years *	statutory retirement age **	67,0	67,0	67,0	67,0	67,0	67,0
	earliest retirement age	62,0	62,0	62,0	62,0	62,0	62,0
	penalty in case of earliest retirement age	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%
	bonus in case of late retirement ***	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
40 contribution years *	statutory retirement age **	63,8	64,5	65,0	65,0	65,0	65,0
	earliest retirement age	62,0	62,0	62,0	62,0	62,0	62,0
	penalty in case of earliest retirement age	8,8%	12,5%	15,0%	15,0%	15,0%	15,0%
	bonus in case of late retirement ***	16,3%	12,5%	10,0%	10,0%	10,0%	10,0%

** We assume that people have accumulated 20 or 40 years of contribution at their earliest retirement age the given year. Statutory retirement age is then reached after that year.*

*** Statutory retirement age is reached when full pension is attain via contribution period or legal retirement age*

**** We assume late retirement to be the legal automatic full rate pension age (67 yo. in 2020 and after)*

NB: we do not distinguish between women and men since they face the same legislation.

Benefit fomula

a. ***Old age pension***

The rules to calculate pensions differ from one scheme to another. We present here only the formula used to calculate the two components of the pension in the private sector (basic pension from the CNAV and complementary pension from the AGIRC-ARRCO) and in the public sector.

[1] Rules may differ from the general situation in certain schemes, for instance, the complementary scheme of independent professions.

[2] Since the 2014 reform, the minimum retirement age for "active service" is increased from 55 years old for generation 1956 and before, to 57 years old for generation 1960 and after.

➢ *Basic private sector pensions (CNAV and aligned schemes)*

In the basic private sector (CNAV) and the aligned schemes (RSI and MSA workers), the pension *P* is calculated according to the following formula:

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

Three factors compose that formula:

- The *reference wage* is the average wage over the 25 best wages (up to the social security ceiling, € 3 428 per month in 2020), with past earnings valorized in line with price inflation.
- The *coefficient of proratisation Min (1,D/T)* with *D* being *the contribution period*, that is the number of years validated by the insured and *T*, the *reference length*. In other words, the pension is reduced in due proportion whenever *D* < *T*. For people born in 1959 (who will be 62 in 2021), *T* equals 41.75 years, this value will increase up to 43 years for people born in 1973 or after.
- The *pension rate t*. The standard rate is 50%.

However, in order to foster senior participation rate in the labor market, either a penalty or a bonus can be applied under certain conditions:

- A penalty is applied to the pension rate when the pension is withdrawn before the full pension age *if* the contribution period is lower than the reference one (*D* < *T*). The deduction is then calculated as Min [Full pension age - Age, (T-D)] multiplied by the rate of deduction (1.25% per missing quarter from the 1953 cohort onward). The new pension rate *t'* is given by:

$$t' = t \times (1 - 1.25\% \times \text{number of missing quarters})$$

- Conversely, the pension is augmented by a premium when individuals decided to continue to work although they had 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% per quarter). The new pension *P'* is given by:

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

There is a minimum contributory pension (named *minimum contributif*) for individuals who meet the requirements for a full pension (ie. they are 67 years old or they have contributed long enough for being granted a full pension before the age of 67) amounting to € 642,93[3] per month in January 2020. This minimum is price-indexed.

➢ *Mandatory complementary pension (AGIRC-ARRCO for all private sector workers)*

Complementary schemes for private sector employees are pay-as-you-go point systems that serve defined-contribution pensions. Contributors acquire each year a certain number of points through their own contributions and those of their employer, calculated on the basis of an acquisition rate τ_t applied to a part of their gross wage. The acquisition rate τ_t equals the contribution rate of the scheme divided by 127%. The purchase price of each point, called "reference wage", depends on the year considered. In January 2020, it amounted to € 17,3982.

$$\textit{Number of points acquired in year } t = \tau_t \times (\textit{Gross wage}_t / \textit{Purchase price of a point}_t)$$

[3] Only individuals whose <u>*total*</u> pension (basic + complementary) does not exceed € 1 191,57 per month (in 2020) are entitled to the minimum contributory pension of the basic scheme. A higher *minimum contributif* also exists for people having contributed 120 quarters.

At retirement, the transformation of accumulated points into a pension benefit is a function of the contributor's age, the contribution length and the selling price of a point at that date. Complementary pension is then calculated as follows:

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

"Full" complementary pension is granted only to those who qualify for a full basic scheme pension. In case one retires before fulfilling the requirements for a full pension as defined by the CNAV, the value of the point is adjusted downwards by means of a "shortfall coefficient" (cf. Table 2.2). For example, a pensioner with 4, 12 or 20 contribution quarters missing will see his pension pro-rated by 0.96, 0.88 or 0.78 respectively.

Following the 2015 agreement (cf. 1.2), a new system of "solidarity coefficients" and "increase coefficients" is factored into the calculation of the complementary pension benefit and is based on the age at which employees acquire full rights to the basic pension under the CNAV general scheme will be put in place, starting with the generation 1957. The coefficients work in the following way:

- For individuals who retire less than one calendar year after the age at which they are entitled to a full basic pension, the AGIRC and ARRCO complementary pension benefits are reduced by a solidarity coefficient of 10% for three years or until they turn 67.
- Individuals who retire between one and two years after that age receive their full pension, with no solidarity coefficient or increase coefficient.
- For each additional year that the individual delays retirement, the AGIRC and ARRCO complementary pension is increased for one year by an increase coefficient of 10% (up to a maximum 30%).
- Pensioners exempted from the "general social security contribution" (*Contribution Sociale Généralisée*: CSG) and certain precarious categories of pensioners[4] are exempted from the solidarity coefficient (but are subject to the increase coefficient). Pensioners paying the CSG at the reduced rate[5] are subject to the solidarity coefficient but with a 5% reduction instead of 10%.

➢ *Pension in the public service scheme (FPE)*

The calculation of the basic pension for public sector workers is very similar to the one in the CNAV:

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

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

- The reference wage taken into account is the wage received the last 6 months (excluding bonuses and other emoluments), as opposed to the average of the best 25 years' wages (including bonuses) in the private sector.
- The 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 main basic 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 1973 and after.

[4] The 30 October 2015 agreement lists the conditions for exemption from solidarity coefficients.

[5] The standard CSG rate for pensioners is 6.6%. The reduced CSG rate (3.8%) and exemption from CSG are subject to means testing.

Unlike private sector employees, public sector employees did not receive complementary pensions until recently. This is why their basic scheme replacement rate is higher. A complementary pension scheme (RAFP) was introduced in 2005 by 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 complementary schemes.

For pensioners who meet the requirements for a full pension, an earnings-related minimum pension is guaranteed (called *minimum garanti*). In 2020, its value was € 14 092,08 per year (€ 1 174,34 monthly) for a 40 year long career.

*b. **Survivor pension***

The surviving spouse's allowances include the survivor's pension (*pension de réversion*), which corresponds to a proportion of the pension which the deceased person could have received and which it is paid to the surviving spouse or ex-spouse and the widowhood allowance (*allocation de veuvage*), which is paid to the surviving spouse depending on her income if she does not meet the conditions of age in order to benefit from a survivor's pension. The survivor's pension may be granted, even if the deceased spouse died before retirement or before reaching the minimum retirement age.

➢ *Basic private sector survivor pensions (CNAV and aligned schemes)*

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

- must have been a 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);
- must earn gross annual income that does not exceed €21,112 if she lives alone, or €33,779.20 if she lives with a partner.

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 survivors pension is equal to 54% of the deceased spouse or ex-spouse's basic pension (or the basic pension she could have benefited from). If the spouse or ex-spouse made 15 years of contributions to the general pension scheme, the minimum amount of your survivor's pension is €3,478.46 per year in 2020. If the deceased had contributed for less than 15 years, this minimum total is reduced proportionally. In 2020, the amount of the survivor's pension cannot exceed €11,106.72 per year.

➢ *Pension in the public service scheme (FPE)*

To benefit from the 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 at least four years
- to have been married to the deceased beneficiary at least two years before the deceased spouse retired;
- to have at least one child with the deceased beneficiary

To benefit from the survivor pension, the surviving spouse must not live with a partner.

The survivor pension is equal to 50% of the deceased spouse or ex-spouse' pension (or the pension she could have benefited from). It can be increased by half of the majoration the deceased spouse benefited 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 pension or not) are below a certain ceiling (€ 10 838,40 a year for a single person and € 16 826,64 for a couple in 2020) are eligible to a minimum pension, named ASPA (standing for "Allocation de solidarité aux personnes âgées") that tops revenues up to the aforementioned ceiling. ASPA-related expenditures amounted to € 3,1 billion in 2018, which represents 1 % of the total amount of pension expenditures.

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 an only pension before and after legal retirement age. On the contrary, the ATMP pension is perceived is cumulative 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 exhibited in the following table. 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 third party for 3rd class); minimum and maximum level also vary from respectively 292.80€ (1st class and 2nd class) per month to 1,418.09€ (3rd class) and from 1,028.40€ (1st class) to 1,714.00€ (2nd class) to 2,839.29€ (3rd class)[6].
- concerning ATMP, the annuel pension (P) equals : P = T x R, with :

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

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

  $R = \text{ref. wage}$ if $\text{ref. wage} \leq R°$

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

  with R° = € 37,262.59. 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 € 902.70 per month in 2020. Howener, 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.

[6] *Source : Public administration official website : www.service-public.fr.*

Indexation

All basic schemes pensions, as well as disability pensions (PI, ATMP), are price-indexed. Past wages taken into account for the pension calculation are also revalued with the Consumer Price Index (excluding tobacco).

According to the latest agreement, complementary schemes' pensions (AGIRC and ARRCO) are price-indexed from 2019 to 2022, then indexed according to the evolution of the average wage affected by a sustainability coefficient of - 1.16 % from 2023 onwards 2020.

Non earnings-related minimum pensions (ASPA and AAH) are also price-indexed.

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 different health contributions: a specific contribution for all pensioners (Additional Solidarity Contribution for Autonomy - Casa) at a rate of 0.3% and a 1% health insurance contribution withholding which is applied to both compulsory and non-compulsory supplementary pension schemes.

Pensioners can benefit from a reduced rate of 3.8% of CSG if their income is below a certain ceiling (€14,780 for a single tax unit in 2020 – calculated on the reference taxable income for 2018) or an intermediate rate of 6.6% if their reference taxable income is between €14,781 and €22,940 in 2018 for a single tax unit. They can also benefit from an exemption of CSG and CRDS if their income is below a certain ceiling (€11,306 for a single tax unit in 2020 – calculated on the reference taxable income for 2018). 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 2019 was 13.3%: 6.4% for income taxation and 6.9% for other taxes (CSG-CRDS-Casa).

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

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

Up to the last projection exercice, the French pension schemes have known five main reforms: the 1993 reform in the private sector, the 2003, 2008, 2010 and 2014 reforms that affect both private and public sectors. Regarding the Ageing Report 2021 projections, the 2015 reform affects the AGIRC-ARRCO schemes, thus the private sector. In addition, the reforms from 2017 to 2019 had a less significant impact on the French pension system.

- The 1993 reform introduced mainly four changes that reduced the pension level:

  - The reference wage is now calculated on the basis of the 25 best wages instead of the 10 best ones;
  - Past wages factored into the calculation of the reference wage are price-indexed (and not wage-indexed anymore);
  - Pensions have become price-indexed;
  - The reference contribution period has been raised from 37.5 to 40 years for private sector employees.

- The 2003 reform:

  - It planned to semi-automatically increase the contribution period necessary to draw a full pension in line with life expectancy gains. The aim was to keep the ratio between contribution period and average length in retirement constant at its value of 2003 (1.79)[7]. In application of that principle, the reference contribution period has increased from 40 years for generation 1948 to 41.5 years for generation 1957. This mechanism has been replaced by the 2014 reform.
  - It created 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). With the legal obligation to study until the age of 16, fewer and fewer people will be eligible to this arrangement.
  - A bonus system was introduced (in all schemes) for people postponing their entry into retirement while they have reached the minimum retirement age and they meet the reference contribution period condition. The penalty for early-retirement was gradually decreased from 10% to 5% of pension benefits for private sector workers and was introduced for the public scheme. 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.
  - A gradual convergence of the public sector schemes toward the private sector one was implemented through three channels: firstly, an increase of the number of contribution years required for entitlement to a full pension (from 37.5 to 40 years); secondly, the creation of a penalty for early retirement and a premium for postponed retirement converging gradually to the value of the parameters in the CNAV; finally, the creation of a complementary scheme (RAFP).

- The 2008 "rendez-vous":

  - The bonus for extra years worked after having reached the required contribution period for a full pension was raised to 1.25% per additional quarter;
  - The possibility of drawing concurrently a pension and a wage 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 conditions for perceiving the *Minimum Contributif (also called Mico)*, a contributory minimum pension created for people entitled to a full pension, were strengthened. This minimum pension is now means-tested in order to target people with low levels of pension more effectively.

[7] Average length in retirement is defined as the life expectancy at age 60 published five years before by the national statistical agency (Insee). Until 2014, the COR pronounced every year (every 4 years before) a recommendation concerning the reference contribution period that will apply to the concerned generation: everyone is therefore informed at age 55 of the actual reference contribution length that will apply to them.

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

  - It introduced a progressive rise of age boundaries. 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. Every generation from generation 1951 to generation 1955 have seen these age limits rise by 4 or 5 months[8]. For example, people born in 1956 can claim their pension at age 62 in 2018 and a full pension at 67 in 2023. The early retirement age for long careers has also been increased by 2 years. The 2010 reform, so as the 2008 "rendez-vous" increased the minimum contribution period required for a full pension before the age of 67.
  - 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%[9] 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, if they meet 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. Rules to compute minimum earnings-related pensions and the contribution rate of civil servants[10] will also converge towards the private sector rules.

- The 2014 reform introduced short-term measures (increase of social contributions of both employees and firms by 0.3 point between 2013 and 2017, removal of the 10 % tax exemption on the pension bonus for pensioners with 3 (or more) children, postponement of the pension indexation) but also 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 (basic private sector schemes, the public sector scheme, special schemes and 2nd pillar schemes);
  - In order to strengthen the governance, a steering committee has been established and has been entrusted with the task to publish a yearly report on the French pension system, including long-term projections. It will make recommendations if there are significant discrepancies with the baseline scenario.

- The 30 October 2015 agreement on complementary 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 and non-executive schemes, and (iv) social contributions.

  - The measures concerning the amount of pension benefits are being implemented from 2016 to 2018; part of the adjustment affects current pension recipients by restricting nominal increases

[8] Initially, a 4 month increase by generation was planned between the generations 1951 and 1956 but the 2012 social security budget law planned an acceleration of this increase.
[9] 10% under specific disability conditions.
[10] The contribution rate for civil servants will increase from 7.85% to 11.10% by 2020. It amounted to 10.29% in 2017.

in existing pensions, and part will affect future pensioners by making the pension system less generous in the long run.

- Incentives to remain in employment ("solidarity coefficients" and "increase coefficients") should raise the effective retirement age and maintain around 100,000 additional persons in the labour force in 2025, thus raising the amount of contributions.
- Merging the AGIRC (executive) and ARRCO (non-executive) schemes in 2019 will simplify the pension system and reduce administrative costs.
- In the new unified scheme, the contribution assessment base will be broadened and certain contribution rates will be increased.

➢ 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 basic 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[11] receive only one pension calculated according to one single benefit formula.

- The reference wage is the average of the 25 best annual wages (valorized in line with inflation) across the entire career.
- An individual can only validate 4 quarters per year: individuals who have contributed to two schemes simultaneaously will get a lower pension than what they would have received before the LURA reform.

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

The following reforms are new to Ageing report 2021 projections :

➢ In May 2019, the evolution of the AGIRC-ARRCO purchase and service value of the point, decided aims to maintain the financial balance of the scheme over a multi-year horizon.Two periods are distinguished: from 2019 to 2022 included, the service value of the point is indexed to the projected inflation excluding tobacco prices and without the possibility of a negative indexation; the purchase value is indexed to the yearly average gross wage. From 2023 to 2030, the service value of the point is indexed to the yearly average gross wage minus a sustainability coefficient equal to -1.16%, and the purchase value to the average gross wage.

➢ In addition, from 2018 to 2020, increases in non earnings-related minimum pensions have been introduced : the solidarity allowance for the elderly (ASPA) has increased from €803 in early 2018 to €903 by 2020 ; the adult disability allowance (AAH), standing at €819 in early 2018, amounts €903 by 2020.

During his presidential campaign, the President announced that he will reform the pension system in order to unify the 42 existing schemes into a single scheme, making the French pension system more clear and fair. This reform was under discussion in parliament before being stopped by the Covid-19 health crisis.

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

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 September 2017. As described above, the rates of return of the AGIRC-ARRCO schemes are assumed to remain constant after the last measures of the 2015 agreement are implemented, in 2018.

In order to prevent the minimum pension expenditures (ASPA and AAH) to decline too much in the projection exercice relatively to the poverty threshold, the ASPA and AAH ceilings are indexed on average wages when they account for less than 50 % of the poverty threshold[12] (60% of the median wage). The impact of this methodological change on the projection results is shown in Table 19 in section 3.6.

The two earnings-related disability pensions (ATMP pension and PI) are wage-indexed in the projections, as their amount mainly depend on past wages taken into account for the pensions calculation[13].

[12] In the projection exercice, the poverty threshold is deemed to evolve practically in the same way as average wage.

[13] This assumption leads to overestimate the disability pensions in the projections, since pensions that have already been provided in a previous year are revalued with the Consumer Price Index (excluding tobacco).

2. Overview of the demographic and labour forces projections

2.1. Demographic development

Table 2 – Main demographic variables

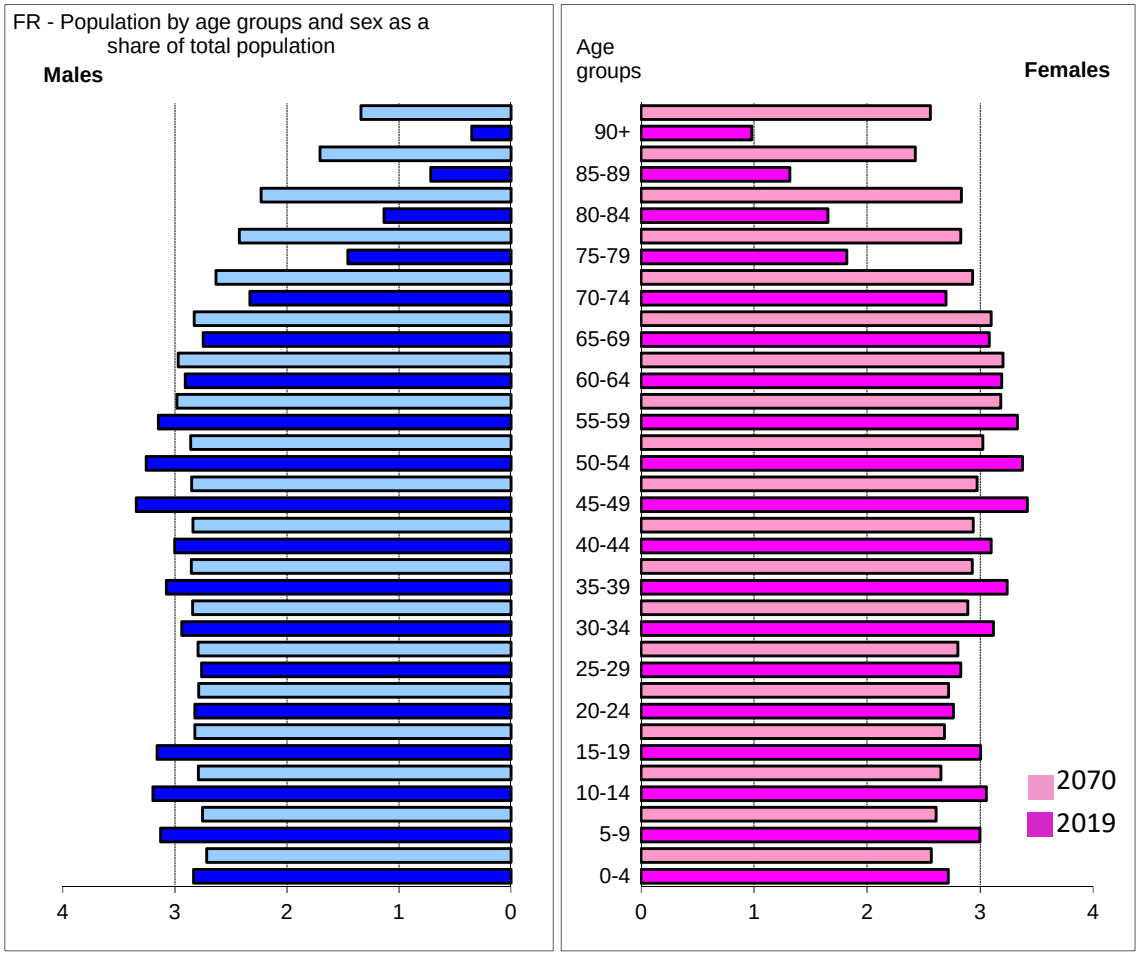
	2019	2030	2040	2050	2060	2070	peak va-lue	peak year	change 2019-2070
Population (thousand)	67 105	68 814	69 834	70 001	69 662	69 426	70034,1	2047	2320,7
Population growth rate	0,2	0,2	0,1	0,0	-0,1	0,0	0,3	2020	-0,2
Old-age dependency ratio (pop 65+ / pop 20-64)	36,5	44,9	51,7	54,8	55,9	56,9	56,9	2070	20,4
Old-age dependency ratio (pop 75+ / pop 20-74)	14,2	19,4	23,8	26,9	28,0	28,7	28,8	2067	14,5
Ageing of the aged (pop 80+ / pop 65+)	30,3	32,1	36,8	40,5	42,2	43,9	43,9	2070	13,5
Men - Life expectancy at birth	80,1	81,6	83,0	84,3	85,6	86,7	86,7	2070	6,6
Women - Life expectancy at birth	86,3	87,4	88,6	89,6	90,6	91,4	91,4	2069	5,1
Men - Life expectancy at 65	20,0	20,9	21,8	22,6	23,5	24,2	24,2	2069	4,2
Women - Life expectancy at 65	24,1	24,9	25,7	26,5	27,2	27,9	27,9	2070	3,8
Men - Survivor rate at 65+	85,9	88,2	90,0	91,5	92,7	93,8	93,8	2070	7,9
Women - Survivor rate at 65+	92,9	94,0	94,9	95,6	96,2	96,7	96,7	2070	3,8
Men - Survivor rate at 80+	62,1	67,1	71,1	74,8	78,0	80,9	80,9	2070	18,7
Women - Survivor rate at 80+	79,3	82,3	84,6	86,7	88,5	90,0	90,0	2070	10,8
Net migration (thousand)	38,1	68,3	73,9	75,2	74,6	80,2	80,4	2024	42,1
Net migration over population change	0,3	0,5	1,1	-4,5	-1,9	-9,4	42,3	2047	-9,7

Source: Commission services based on Eurostat EUROPOP2018 data
*Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2016 to 2070.*

Table 2 provides an overview of the demographic development until 2070. The total size of the population will increase until 2070 up to 69 million people, increasing until 2050 and slightly decreasing thereafter. This global increase of the total population comes mainly from the increase in life expectancies, mitigated by lower fertility rates in the second half of the period.

The age composition will change towards older people: 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) will increase from 36.5% in 2019 to 56.9% in 2070. Most of the increase in old-age dependency ratio will occur before 2050: after this date, the ratio will sligthly increase because the increase in the number of 65+ people and the decrease in the numer of 20 to 64 people will be much lower. The "ageing of the aged" ratio, which is defined by people older than 80 years old as a share of people aged 65 or above, will first decrease until 2025, then increase the remainder of the projection period. Among the 65 years old and older group, the age composition will thus change towards a higher share of the elderly (over 80).

Figure 1 – Age pyramid, comparison between 2019 and 2070



Source: Commission services based on Eurostat EUROPOP2018 data

The main differences between the age composition of the population in 2016 and 2070 are the following ones:

- The share of people aged between 25 and 49 will be significantly lower in 2070 than in 2016.
- On the contrary, the share of people aged 69 and above will be higher in 2070 than in 2016.

Due to the dynamic fertility, the share of young people will still be high in 2070. As a whole, the age pyramid would be flatter in 2070 than in 2016.

The comparisons between age pyramids in 2016 and 2070 are quite similar between men and women, except that the share of the elderly will be even higher for women than for men in 2070.

2.2. Labour force

Pension reforms that shift retirement age (both early and statutory) or rise contribution period requirements as well as active labour market policies aim to prolong working life.

Table 3 – Participation rate, employment rate and share of workers for the age groups 20-64, 20-74, 55-64 and 65-74

	2019	2030	2040	2050	2060	2070	peak value	peak year	change 2019-2070
Labour force participation rate 20-64	78,0	78,8	79,7	80,0	80,1	80,0	80,2	2057	1,9
Employment rate of workers aged 20-64	71,6	72,4	73,8	74,6	74,7	74,5	74,8	2057	2,9
Share of workers aged 20-64 in the labour force 20-64	91,8	91,9	92,6	93,2	93,2	93,2	93,2	2057	1,5
Labour force participation rate 20-74	66,2	66,5	67,2	68,2	68,3	68,2	68,5	2066	2,0
Employment rate of workers aged 20-74	60,8	61,2	62,3	63,7	63,8	63,7	64,0	2066	2,9
Share of workers aged 20-74 in the labour force 20-74	91,8	92,0	92,7	93,4	93,4	93,4	93,4	2055	1,6
Labour force participation rate 55-64	56,9	62,9	65,8	66,4	67,3	67,0	67,3	2058	10,1
Employment rate of workers aged 55-64	53,0	58,7	61,8	62,7	63,5	63,3	63,6	2058	10,2
Share of workers aged 55-64 in the labour force 55-64	93,2	93,4	93,9	94,3	94,4	94,4	94,4	2065	1,2
Labour force participation rate 65-74	5,5	9,1	11,8	14,4	14,0	14,6	14,7	2067	9,0
Employment rate of workers aged 65-74	5,4	8,8	11,5	14,1	13,6	14,2	14,3	2067	8,8
Share of workers aged 65-74 in the labour force 65-74	97,2	96,8	97,1	97,4	97,4	97,4	97,4	2059	0,2
Median age of the labour force	41,0	41,0	41,0	41,0	42,0	41,0	42,0	2056	0,0

Source: Commission services

*Explanatory note: *This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2019 to 2070.*

The effects of these reforms in France are reflected in the increase of participation rate and employment rate of the elderly (see Table 3). In line with the rise observed during the past 10 years, participation and employment rates of the 55 to 64 years old will globally keep increasing until 2060: respectively from 56.9 % in 2019 to 67.3 % in 2060 for the participation rate, and 53.0 % to 63.6 % for the employment rate.

Table 4a – Labour market exit age, effective retirement age and expected duration of life spent in retirement – MEN

	2020	2030	2040	2050	2060	2070	peak value	peak year	change 2020-2070
Average effective retirement age (administrative data)*	62,0								
Average labour market exit age (CSM)**	62,3	63,6	64,5	64,7	64,7	64,7	64,7	2042	2,4
Contributory period	38,3	33,8	34,9	34,8	34,2	34,6	38,3	2020	-3,7
Duration of retirement***	22,2	21,6	22,6	22,6	23,5	24,2	24,2	2069	2,0
Duration of retirement/contributory period	0,6	0,6	0,6	0,6	0,7	0,7	0,7	2069	0,1
Percentage of adult life spent in retirement****	33,4	32,1	32,7	32,6	33,5	34,1	34,1	2069	0,8
Early/late exit*****	7,8	3,4	1,9	1,6	1,5	1,4	7,8	2020	-6,4

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

Table 4b – Labour market exit age, effective retirement age and expected duration of life spent in retirement – WOMEN

	2020	2030	2040	2050	2060	2070	peak value	peak year	change 2020-2070
Average effective retirement age (administrative data)*	62,6								
Average labour market exit age (CSM)**	62,2	63,3	64,1	64,3	64,3	64,3	64,3	2041	2,1
Contributory period	32,4	28,8	31,0	30,7	31,6	31,1	32,4	2020	-1,2
Duration of retirement***	26,7	26,7	26,6	27,4	28,1	28,8	28,8	2069	2,1
Duration of retirement/contributory period	0,8	0,9	0,9	0,9	0,9	0,9	0,9	2025	0,1
Percentage of adult life spent in retirement****	37,6	37,1	36,6	37,2	37,8	38,3	38,3	2069	0,7
Early/late exit*****	10,9	3,7	2,1	1,7	1,7	1,5	10,9	2020	-9,4

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

*Explanatory note: * The effective retirement age shows the age at which people on average start receiving a pension benefit. It is calculated on the basis of the administrative data for 2019 (see Annex Tables A4a and A4b); ** The labour market exit age as calculated based on Labour Force Survey data for the base year and estimated by the Cohort Simulation Model thereafter; *** 'Duration of retirement' is calculated as the difference between the life expectancy at the average labour market exit age and that exit age itself; **** The 'percentage of adult life spent in retirement' is calculated as the ratio between the duration of retirement and the life expectancy minus 18 years; ***** Early/late exit is the ratio between those who retire and are below the statutory retirement age and those who retire at the statutory retirement age or above.*

The considerable diversity between the different schemes in terms of careers, particularly the age of entry or demographics such as the share of women with the subject of the contribution quarters allocated for maternity and child-rearing represent a limitation of the indicator presented in Table 4 for France. Finally, differences in retirement age between schemes represent another limitation.

3. Pension projection results

3.1. Extent of the coverage of the pension schemes in the projections

The French projections cover all public pensions. Both basic and mandatory complementary schemes have been taken into account. 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.

The projections cover old-age and early pensions as well as survivors' pensions and the minimum old-age allowance, called "ASPA" (formerly "minimum vieillesse"). They also cover disability pensions paid before and after the minimum retirement age (including "pension d'invaliditié" (PI), allowance for disabled adults (AAH), and "ATMP" pension for adults with a disability due to work and reducing their capacity to work), even though they are part of health expenditures in the French accounting system.

People eligible to both ATMP pension and PI are identified from the administrative dataset of the Health insurance schemes. Using aggregated data from the Ministry of Solidarity and Health, we estimate that 15 % of people eligible for AAH are also eligible for an ATMP pension or PI. Data on disability include expenses and number of French people living abroad.

Table 5 - Eurostat (ESSPROS) vs. Ageing Working Group definition of pension expenditure (% GDP)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Change 2009-2019
1 Eurostat total pension expenditure	*14,3*	*14,4*	*14,5*	*14,8*	*15,1*	*15,1*	*15,1*	*15,1*	*14,9*			
2 Eurostat public pension expenditure												
3 Public pension expenditure (AWG)					*14,6*	*14,5*	*14,3*	*14,2*	*14,0*	*14,9*		
4 Difference (2) - (3)												
5 Expenditure categories not considered in the AWG definition, please specify:												
5.1Early retirement benefits												

Source: Eurostat ESSPROS data (July 2017) and Social Protection Accounts, 2014 and 2018
Early retirement benefit values before 2011 are interpolated.

In this exercise like in the 2015 and 2018 ones, we strictly limit expenditures to pensions and take into account disability pensions paid before and after the legal retirement age. Similarly to the 2018 exercise, we include the allowance for adults with disability (AAH, 0.4% of GDP) in disability pensions, which are not included by Eurostat and was previously in long-term care projections. This allowance was shifted from long-term care to disability pensions due to changes in social protection accounts' classifications.

Only a global projection of pension expenditures is provided in the projections, aggregating all mandatory pension schemes for public, private and self-employed workers. The following table lists the main pension schemes along with the amount of pensions distributed in 2018. No particular assumption is made about the evolution of the respective shares of the different schemes.

	Billion € 2018	**% of GDP**
CNAV	128,3	5,5 %
CNAVPL*	1,6	0,1 %
MSA employees	8,0	0,3 %
AGIRC-ARRCO	79,6	3,4 %
FPE	55,4	2,3 %
CNRACL	20,4	0,9 %
Special schemes[14]	11,6	0,5 %
MSA farmers*	12,7	0,5 %

Source: Social Protection Accounts, Drees, 2020
**basic scheme only*

3.2. Overview of projection results

Gross public pension spending is predicted to decrease from 14.8 % of GDP in 2019 to 12.6 % in 2070, and peak in 2032 at 15.6 % of GDP, which represents an overall decrease of 2.2 GDP points over the whole 2019-2070 period. Net public pension[15] spending is also predicted to decrease from 12.8 % of GDP in 2019 to 10.9 in 2070, and peak in 2032 at 13.5 % of GDP which represents an overall decrease of 1.9 GDP points over the whole 2019-2070 period (Table 6).

Pension contributions refer only to contributions that are collected on labour income, and not taxes on pensions since they are not directly attributed to the financing of pension system. It must also be highlighted that those contributions represent only a part of the global resources available: for old age pensions, it represents around 80% of the global resources available in 2019; the remaining 20% is collected through earmarked taxes, the FSV financial fund and taxes based on all the other types of revenue (capital, replacement revenue…). Public pension contibutions are also predicted to decrease of 0.3 GDP points over the next five years but to remain stable around 11.5% of GDP until 2070.

[14] SNCF, CRPCEN, CAVIMAC, ENIM, CANSSM, CNBF
[15] Computed applying an average tax rate to the total gross public pensions.

Table 6 - Projected gross and net pension spending and contributions (% GDP)

Expenditure	2019	2030	2040	2050	2060	2070	Peak value	Peak year**	Change 2019-2070
Gross public pension expenditures	14,8%	15,6%	15,2%	14,3%	13,4%	12,6%	16,2%	2020	-2,2
Pivate occupational pensions	:	:	:	:	:	:	:	:	
Private individual mendatory pensions	:	:	:	:	:	:	:	:	
Private individual non mendatory pensions	:	:	:	:	:	:	:	:	
Gross total pension expenditures	14,8%	15,6%	15,2%	14,3%	13,4%	12,6%	16,2%	2020	-2,2
Net public pension expenditures*	12,8%	13,5%	13,2%	12,4%	11,6%	10,9%	14,1%	2020	-1,9
Net total pensoin expenditures*	12,8%	13,5%	13,2%	12,4%	11,6%	10,9%	14,1%	2020	-1,9
Contributions	**2019**	**2030**	**2040**	**2050**	**2060**	**2070**	**Peak value**	**Peak year****	**Change 2019-2070**
Public pension contributions	11,8%	11,5%	11,5%	11,5%	11,6%	11,6%	12,2%	2020	-0,2
Total pension contributions	11,8%	11,5%	11,5%	11,5%	11,6%	11,6%	12,2%	2020	-0,2

Source: Commission services; Insee, DESTINIE model

*Explanatory note: *net pension expenditure excludes taxes on pensions and compulsory social security contributions paid by beneficiaries.**This column represents a peak year, i.e. the year in which the particular variable reaches its maximum over the projection period 2019 to 2070.)*

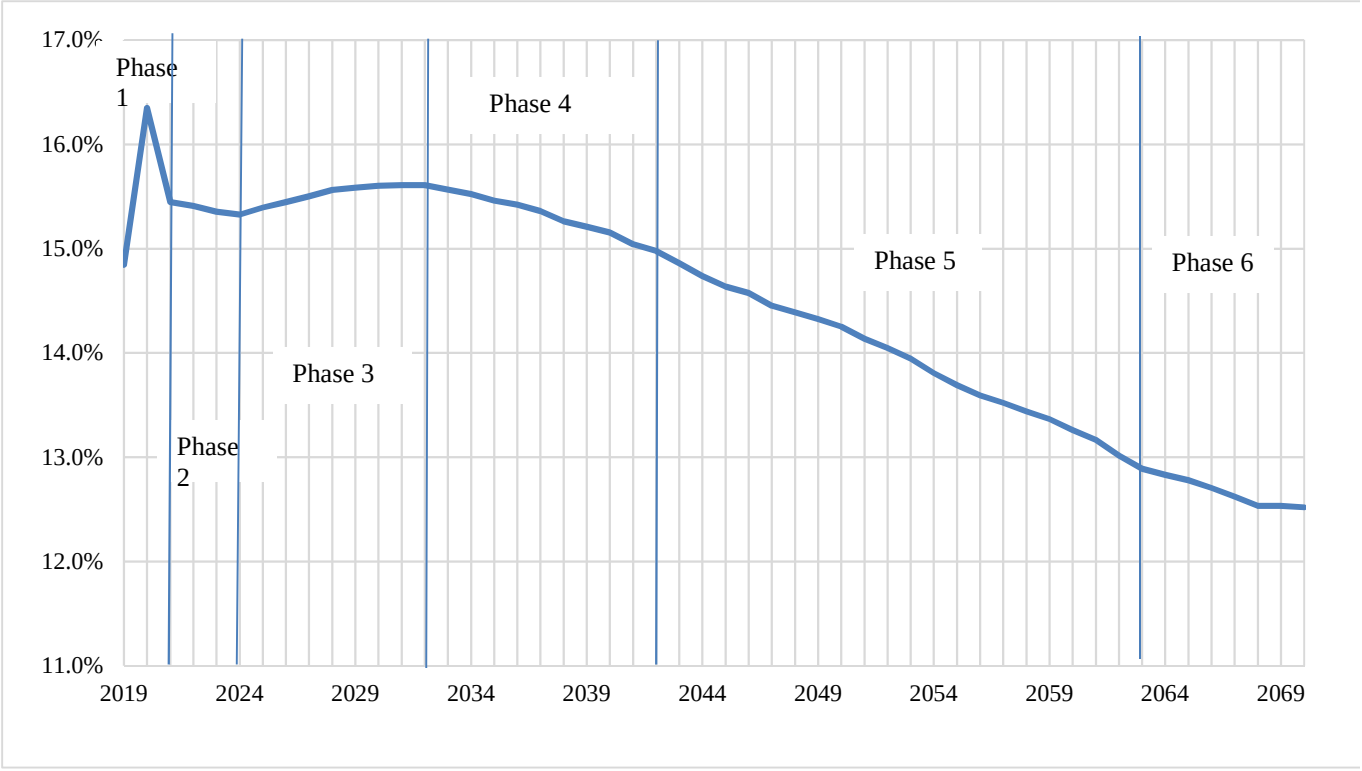
Concerning the 2019-2070 evolution of the ratio between projected gross pension expenditures and GDP, six periods can be identified (Graph 2):

- Phase 1: Following the Covid-19 crisis, GDP was revised downwards which mechanically increased the weight of pension expenditure to GDP. Up to 2021, pension expenditures as a share of GDP will mainly reflect macroeconomic forecasts too.
- Phase 2: From 2021 to 2024, pension expenditures as a share of GDP will slightly decrease from 15.4% to 15.3% despite the ageing of the population due to the progressive increase of the retirement age (past reforms).
- Phase 3: From 2025 to 2032, the ratio between pension expenditures and GDP will increase up to 15.6% and then stagnate around this level until 2032. During this period, the number of pensioners and the amount of new pensions is expected to continue raising at a sustained pace.

The ratio of pension expenditures to GDP is expected to decline continuously over the period 2033-2070, to reach 12.5 % of GDP in 2070. This decline can be further broken down into three sub-periods:

- Phase 4: From 2033 to 2042, growth in pension expenditures will start showing signs of deceleration which reflects the effect of the 2014 reform which consists in a progressive increase of the minimum contribution period for a full rate pension.
- Phase 5: From 2043 to 2063, pension expenditures as a share of GDP are expected to decline due to the slowdown of the ageing process which will prevent the number of people aged 65 and above and hence the number of retirees from growing. Strong nominal GDP growth relative to growth in pension expenditures will also contribute to the sustained decline in the public pension expenditure-to-GDP ratio.
- Phase 6: From 2063 to 2070, pension expenditures as a share of GDP will continue to decline but at a slower pace as the growth rate of people aged 65 and above will accelerate and nominal GDP growth will slightly decelerate.

Figure 2 - Projected pension expenditures (% of GDP)



Source: Insee, DESTINIE model, calculations: DG Trésor

Table 7 - Projected gross public pension spending by scheme (% GDP)

Pension scheme	2019	2030	2040	2050	2060	2070	Peak value	Peak year *	Change 2019-2070
Total public pensions	14,8%	15,6%	15,2%	14,3%	13,4%	12,6%	16,2%	2020	-2,2
Old age and early pensions:	12,1%	13,1%	12,8%	12,1%	11,4%	10,7%	13,4%	2020	-1,4
Flat component	:	:	:	:	:	:	:	:	:
Earnings related	12,0%	12,8%	12,5%	11,8%	11,1%	10,5%	13,1%	2020	-1,5
Minimum pensions (non-contributory) i.e. minimum income guarantee for people above 65	0,2%	0,2%	0,3%	0,3%	0,2%	0,2%	0,3%	2040	0,1
Disability pensions	1,10%	1,08%	1,03%	0,97 %	0,95%	0,95%	1,2%	2020	-0,1
Survivor pensions	1,53%	1,46%	1,36%	1,18%	1,06%	0,94%	1,67%	2020	-0,6
Other pensions	:	:	:	:	:	:	:	:	:

Source: Commission services; Insee, DESTINIE model

Note : Old age and early pensions include special sheme pensions

As old-age earnings-related pension expenditures represent the major share of total pension expenditures, they follow the same evolution as described in 3.1.2. section : old-age earnings-related pension spending (Table 7), as a share of GDP, would go down from 12.1 % of GDP in 2019 to 10.7 % of GDP in 2070. By shifting the legal and statutory retirement ages, and increasing the minimum contribution period, the 2014 reform contributed to reduce the weight of total pension expenditures in GDP. Moreover, more fragmented careers and later entry into the labour market imply a lower average amount of pensions as well as a lower average replacement rate at retirement.

The ratio between non earnings-related old-age pensions ("ASPA" or "minimum vieillesse") and GDP will first increase until 2037 and then slightly decrease to 0.2 % by 2070 (the impact of the change in the indexation mechanism from 2063 onwards (wage instead of CPI indexation) is relatively small (cf. Table 19).

Survivors' pensions, as a share of GDP, are expected to decline from 1.1 % in 2019 to 1.0 % of GDP in 2070. The overwhelming majority of survivor pensions' beneficiaries are women: the reduction of the gap between life expectancies of men and women, the relative increase of women employment rates, and the decrease of the number of weddings induce that women will have a lower and time-limited amount of survivors' pensions over the projection period.

Non-earnings-related minimum disability pension expenditures (AAH), as a share of GDP, are projected to decline slightly until 2063 in the baseline scenario as AAH is price-indexed at first[16].

[16] The government has decided to increase the AAH (non-earnings-related disability pension) on an extraordinary basis in November 2018 and November 2019 in order to bring the amount of the benefit to 900 euros by 2019 from 810,89 euros in 2017. -

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

In order to identify more clearly the driving forces behind the projection results, the pension-to-GDP ratio is split into 4 factors:

Figure 2 – Disaggregation of public pension expenditure

$$\frac{pension\ \ exp enditure}{GDP} = \frac{population\ \ 65+}{population\ \ 20-64} \times \frac{number\ \ of\ \ pensioners}{pop ulation\ \ 65+} \times \frac{average\ \ pension\ \ income}{\frac{GDP}{hours\ \ worked\ \ 20-74}} \times \frac{population\ \ 20-64}{hours\ \ worked\ \ 20-74} \quad [1]$$

(dependency ratio; coverage ratio; benefit ratio; labour market effect)

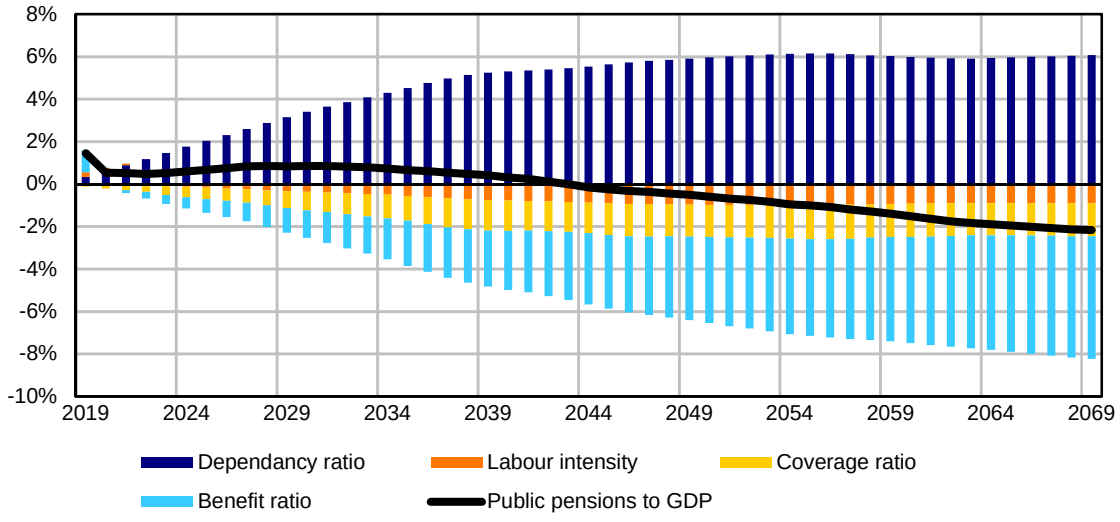
$$\frac{number\ \ of\ \ pensioners}{pop ulation\ \ 65+} = \frac{number\ \ of\ \ pensioners\ \ 65+}{pop ulation\ \ 65+} + \left(\frac{number\ \ of\ \ pensioners\ \ \leq 65}{population\ \ 50-64} \times \frac{population\ \ 50-64}{population\ \ 65+}\right) \quad [2]$$

(coverage ratio old-age; coverage ratio early-age; cohort effect)

$$\frac{population\ \ 20-64}{hours\ \ worked\ \ 20-74} = \frac{population\ \ 20-64}{employed\ \ people\ \ 20-64} \times \frac{employed\ \ people\ \ 20-64}{hours\ \ worked\ \ by\ people\ \ 20-64} \times \frac{hours\ \ worked\ \ by\ people\ \ 20-64}{hours\ \ worked\ \ by\ peop le\ 20-74} \quad [3]$$

(1/employment rate; 1/labour intensity; 1/career shift)

Figure 3 - Contribution of the main driving forces to the projection results



Source: Insee, DESTINIE model, calculations: DG Trésor

On the basis of the Eurostat demographic assumptions, the dependency ratio (population 65+/population 20-64) notably increases up to 2055 and then remains stable until 2070 (Figure 3). Concerning the impact, *ceteris paribus*, of each of the factors considered on the evolution of pension expenditures (Table 8.a), the dependency ratio pushes up pension expenditures between 2019 and 2070 (+6.5 pp).

The coverage ratio (pensioners/population 65+) regularly decreases until 2040 and then stabilizes up to 2070. This is linked to the increase in retirement ages planned by the 2010 reform, but also to the increase in the full pension contribution period planned by the 2014 reform which, associated with an increase in the labour market entry age, leads to higher retirement ages. The coverage ratio mainly reduces public pension expenditures as a share of GDP until 2040 (-1.3 pp).

The benefit ratio (defined as the average pension benefit divided by the economy-wide average wage) declines all along the period (except in 2020), to reach in 2070 a level which is 66% lower than the current level. The reduction of the benefit ratio reflects the subdued growth pace of the average pension compared to that of the average wage per worker. First, the increase in discontinuous careers due to high unemployment rates will not only decrease the average of the 25 best yearly wages (used to calculate the pension) but also impact *the prorata coefficient* if individuals do not have the required number of contributed years. Second, pensions are price-indexed while the average wage per worker increases in line with labour productivity or GDP per worker, hence more rapidly. Finally, changes to the benefit formulae induced by the last reforms will also contribute to the decline of the benefit ratio.

The labour market indicator (population aged 20 to 64/employed population aged 20 to 74) declines over the first 30 years of the projection horizon and remains quite stable thereafter.

Table 8 - Factors behind the change in public pension expenditure between 2019 and 2070 (percentage points of GDP) – pensioners

	2019-30	2030-40	2040-50	2050-60	2060-70	2019-70
Public pensions to GDP	0,8	-0,4	-0,9	-0,9	-0,8	-2,2
Dependency ratio effect	3,4	2,3	0,9	0,3	0,2	7,1
Coverage ratio effect*	-1,1	-0,6	-0,1	-0,1	-0,1	-2,0
Coverage ratio old-age	-0,1	-0,1	0,0	0,0	0,0	-0,2
Coverage ratio early-age	-1,3	-1,7	0,0	-0,5	-0,2	-3,7
Cohort effect	-3,0	-2,2	-1,1	0,0	-0,1	-6,5
Benefit ratio effect	-1,0	-1,6	-1,4	-1,1	-0,9	-5,9
Labour market effect	-0,3	-0,4	-0,2	0,0	0,0	-1,0
Employment ratio effect	-0,2	-0,3	-0,2	0,0	0,0	-0,6
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	-0,2	-0,1	-0,1	0,0	0,0	-0,4
Residual	-0,2	-0,1	0,0	0,0	0,0	-0,4

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

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

The benefit ratio (BR - calculated as the average pension compared to the economy-wide average wage) and the replacement rate (RR - calculated as the ratio between the average pension of new pensioners and the average wage at retirement) will both decline during the projection horizon (Table 09). This decline comes from several factors: the rise in the full pension contribution period, the rule used to discount past wages entering into the benefit formula in interaction with an increase in the labour market

entry age and more fragmented careers, the development of polypension (when one pensioner cumulates several pensions) that can imply smaller pensions because of the specific rules applied in this situation.

RR are usually calculated individually, by comparing the new pension at retirement with the last wage at retirement[17], and presented through the median replacement rate of the population. They are also often calculated for theoretical or typical careers, for instance an entire career of a private sector employee paid at the average wage. On the contrary in this exercise, RR are *averaged* over all careers and all schemes; they are therefore smaller than the replacement rates exhibited in other reports, and should be interpreted carefully. The BR, calculated by comparing pensions and wages of different generations, is not a replacement rate: its evolution reflects the relative differences in the standards of living of the workers and the pensioners.

Table 9 - Benefit ratio (BR), Replacement rate at retirement (RR) and Coverage by pension scheme (in %)

	2019	2030	2040	2050	2060	2070	change 2019-2070 (pps)
Public scheme (BR)	41%	39%	35%	32%	30%	28%	-13%
Coverage	61,3	58,5	57,3	56,5	55,7	55,3	-6,0
Public scheme: old-age earnings related (BR)	52%	50%	45%	41%	38%	35%	-17%
Public scheme: old-age earnings related (RR)	54%	50%	40%	42%	37%	35%	-20%
Coverage	38,7	37,9	37,1	36,9	36,6	36,6	-2,1
Private occupational scheme (BR)	:	:	:	:	:	:	:
Private occupational scheme (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Private individual schemes (BR)	:	:	:	:	:	:	:
Private individual schemes (RR)	:	:	:	:	:	:	:
Coverage	:	:	:	:	:	:	:
Total benefit ratio	:	:	:	:	:	:	:
Total replacement rate	0	0	0	0	0	0	0%

Source: Commission services ; Insee, DESTINIE model, calculations: DG Trésor
Explanatory note: 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.

Like in the 2018 exercise, there are two reasons why the number of pensioners is higher than the number of people aged 65 and older (Table 10): on the one hand, some of the pensioners are younger than 65. On the other hand, pensioners living abroad are included, while the demographic projections are limited to the French territory[18]. In addition, pensioners living abroad are fewer in the 2021 projections than it was in 2018.

The number of pensioners increases by 25% between 2019 and 2070, versus 0,3% only for the employed population (Table 10). The growth of the number of pensioners is mostly concentrated before 2040, in line with the demographic projections. This leads to an increase in the retired-to-employed population

[17] Nonetheless, the definition of the replacement rate varies over the sources, and especially the definition of the reference wage. There are many different publications which compare the new pension with the last full-time wage, the average last 5 yearly wages, the wage at 50 years old, etc.
[18] As a matter of fact, the sample of the population used to feed the Destinie model includes people living in France only, but pensioners living abroad are included ex-post.

ratio between 2019 and 2070, with a stronger increase before 2040. The old-age dependency ratio follows the same trend. The system efficiency ratio is expected to decrease over the projection period, mainly due to the evolution of the old-age dependency ratio.

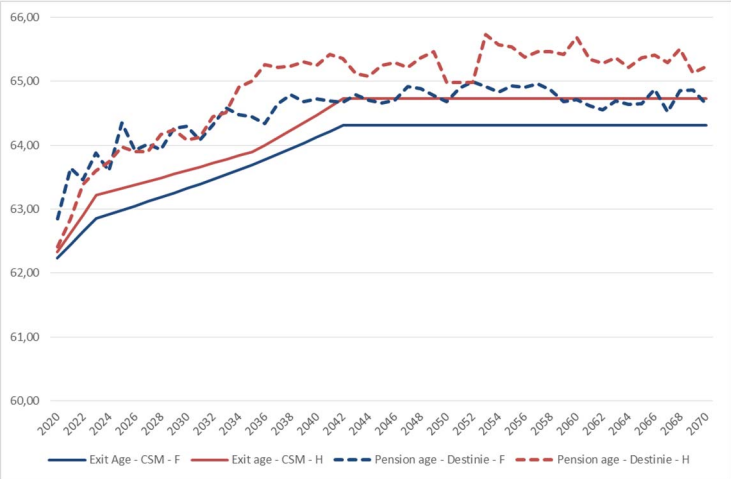
Table 10 – System Dependency Ratio and Old-age Dependency Ratio

	2019	2030	2040	2050	2060	2070	change 2019-2070
Number of pensioners (thousand) (I)	24079,9	27326,2	29694,4	30748,1	30925,9	30935,6	6855,7
Employment (thousand) (II)	27566,1	27869,4	28010,2	28016,8	27826,1	27641,2	75,1
Pension system dependency ratio (SDR) (I)/(II)	87,4	98,1	106,0	109,7	111,1	111,9	24,6
Number of people aged 65+ (thousand) (III)	13611,4	16555,4	18680,9	19443,9	19724,0	19942,3	6331,0
Working age population 20-64 (thousand) (IV)	37326,7	36906,3	36101,7	35510,6	35255,3	35050,7	-2275,9
Old-age dependency ratio (OADR) (III)/(IV)	36,5	44,9	51,7	54,8	55,9	56,9	20,4
System efficiency (SDR/OADR)	2,4	2,2	2,0	2,0	2,0	2,0	-0,4

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

With regard to the age decomposition (Tables 11.a to 12.b), one should note that before the age of 60, the ratio of pensioners to inactive population and total population is below 100% because there are few possibilities to retire before 60. Around 90% of the pensioners younger than 54, and 70% of the pensioners between 55 and 59 years old are disability pensioners. Conversely, this ratio is generally above 100% for individuals aged 60 or above partly because inactive population is estimated on the French territory while pensioners living abroad are still included in the projection (they account for approximately 6% of total pensioners). Moreover, the computation of the pensioners-to-inactive population and pensioners–to-total population ratios by age groups rely on two different data sources. The number of pensioners by age groups is calculated based on national projections (old-age pensions and disability pensions). Inactive and total population figures stem from labour force projections obtained through the CSM method run by the Commission. Compared to the 2018 projection exercise, there is a better match between CSM projection of the labour force exit age and the pension age projected by the French microsimulation model (Graph 4.c). The pension age for men is slightly lower than the labor market exit age calculated by the Commission. This is due to the early retirement scheme for long careers which is not factored into the CSM calculation.

Figure 4c - Average labour market exit age (CSM) vs pension age (Destinie)



Source: Commission services, Insee Destinie model, calculation: DG Trésor

The pensioners-to-inactive population ratios by age groups are broadly stable over the projection period, except for the age group 60-64. The ratio for the age group 60-64 declines by 20pp between 2016 and 2070. Although we should remain very cautious in the interpretation of this ratio and its evolution given the aforementioned limitations, the evolution of the ratio likely reflects the effect of the 2010 and 2014 reforms that have increased the retirement age and the conditions for being granted a full rate pension. Hence, a larger share of people aged between 60 and 64 is expected to be working in the coming decades. This is also reflected by the evolution of the share of 60 to 64 year old pensioners among the total 60 to 64 year old population which is projected to sharply decrease over the projection horizon. The same trend holds for women (Tables 13.a and 13.b).

The coverage ratio profiles also depend on retirement behaviour assumptions. But as the French pension system is almost actuarially neutral at the margin, the impact of this assumption on public pension expenditures is small (cf. annex E).

Table 11A – Pensioners (public schemes) to inactive population ratio by age group (%)

	2019	2020	2030	2040	2050	2070
Age group -54	8,4	8,5	8,3	8,2	8,1	8,1
Age group 55-59	88,7	87,3	90,5	84,3	82,0	77,3
Age group 60-64	93,8	92,1	95,0	88,8	88,6	86,3
Age group 65-69	109,3	108,2	112,2	113,3	117,9	116,1
Age group 70-74	107,7	107,7	107,3	108,3	110,1	110,2
Age group 75+	104,3	104,5	105,9	105,9	105,7	105,7

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

Table 11B – Pensioners (public schemes) to population ratio by age group (%)

	2019	2030	2040	2050	2060	2070
Age group -54	3,8	3,7	3,6	3,6	3,7	3,6
Age group 55-59	20,3	20,6	20,1	19,2	18,9	18,1
Age group 60-64	60,6	49,3	40,1	38,3	37,5	36,7
Age group 65-69	100,8	95,0	90,9	90,2	89,6	88,4
Age group 70-74	104,6	104,8	104,6	105,1	104,6	105,1
Age group 75+	104,3	105,9	105,9	105,7	105,8	105,7

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

Table 12A – Female pensioners (public schemes) to inactive population ratio by age group (%)

	2019	2030	2040	2050	2060	2070
Age group -54	8,0	7,9	7,8	7,7	7,8	7,4
Age group 55-59	83,7	84,9	80,5	79,6	76,6	72,6
Age group 60-64	92,6	92,6	91,4	90,3	90,5	89,2
Age group 65-69	106,0	107,9	111,6	115,3	116,4	115,9
Age group 70-74	105,9	106,8	108,1	110,0	108,4	110,6
Age group 75+	104,1	105,7	105,6	105,4	105,6	105,2

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

Table 12B – Female pensioners (public schemes) to total population ratio by age group (%)

	2019	2030	2040	2050	2060	2070
Age group -54	3,8	3,6	3,5	3,5	3,5	3,4
Age group 55-59	21,8	22,1	21,5	20,1	19,3	18,3
Age group 60-64	60,7	50,7	43,9	41,8	40,9	40,3
Age group 65-69	99,2	93,2	90,6	89,4	89,8	89,2
Age group 70-74	103,8	104,5	104,6	105,2	103,8	105,6
Age group 75+	104,1	105,7	105,6	105,4	105,6	105,2

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor

The flow of new pension expenditures (public old-age earnings-related pensions for new pensioners) can be broken down as the product of three terms: the average amount of new pensions, the number of

new pensioners[19] and the average number of months paid in the first year. The average amount of new pensions can also be analyzed as the product of three terms (table 14.a)[20]:

1. the average contribution period of new pensioners ;
2. the value of pensionable earnings of new pensioners computed as the average of the present value of the 25 best annual wages[21] ;
3. the effective average accrual rate for new pensioners There is no administrative accrual rate in the French legislation. Nevertheless, given the average amount of new pensions, the average contribution period among of new pensioners and the value of pensionable earnings of new pensioners, it is possible to estimate ex-post "effective" accrual rates (see annex F).

There is no sustainability factor in the French pension system, therefore this factor remains constant over the projection period.

The projected new pension expenditure is higher for men when compared to women (up to 24.6 M€ for men vs. 20.1 M€ for women by 2070) even if women are more represented among new pensioners. This is explained by the fact that women validate fewer quarters because of chopped careers and receive on average lower salaries which impact negatively their average pension when compared to men.

Table 13a - Disaggregation of new public pension expenditure (old-age and early earnings-related pensions) – Total

	2019	2030	2040	2050	2060	2070
Projected new pension expenditures (million EUR)*	4 014	7 481	11 601	16 972	20 621	31 831
I. Number of new pensioners ('000)	621,9	804,4	772,7	803,3	698,4	737,8
II. Average contributory period	33,0	31,1	32,8	32,7	32,8	33,0
III. Average accrual rate (%)	1,1	1,2	1,1	1,1	1,0	1,0
IV. Monthly average pensionable earnings (€)	3 077	3 633	5 5848	7 490	10 656	15 244
V. Sustainability/Adjustment factor	1	1	1	1	1	1
VI. Average number of months paid the first year	5,9	6,6	7,6	8,0	8,1	8,2
(Monthly average pensionable earnings) / (Monthly economy-wide average wage)	101,7%	93,7%	104,0%	98,3%	98,4%	99,1%

Source: Insee, DESTINIE model, calculations: DG Trésor

Explanatory note: Monthly average pensionable earnings are calculated as the average of the present value[22] of the 25 highest annual wages of each individual.

**New pension expenditure equals the product of I, II, III, IV, V & VI*

[19] As noted previously, it is common for a French pensioner to receive several pensions due to the design of the pension system. Therefore, we do not use the number of new pensions (as recommended by the Commission) but the number of new pensioners for all the calculations.

[20] In table 14 (a,b and c), point system schemes pensions are decomposed as if they were computed using the defined benefit schemes formula and added to the decomposition of DB pensions. For the breakdown of new public pension expenditures by type of scheme, cf. annex F.

[21] In practice, the reference wage defined in the legislation depends on the sector considered: the 25 best years wage average is used in the general scheme, whereas the whole career wages are used to acquire points in the complementary pension scheme, and in the public service scheme, the reference wage is the last 6-month wage (excluding bonuses). By convention for the new pension decomposition (but not in the pension calculation), the 25 best years wage average has been retained for all pension schemes.

[22] Past wages are are valorized in line with CPI.

Table 13b - Disaggregation of new public pension expenditure (old-age and early earnings-related pensions) – MALE

	2019	2030	2040	2050	2060	2070
Projected new pension expenditures (million EUR)*	2 074	3 776	5 771	9 052	10 648	18 436
I. Number of new pensioners ('000)	284,2	380,4	353,0	391,3	326,8	384,7
II. Average contributory period	37,0	33,8	34,9	34,8	34,2	34,6
III. Average accrual rate (%)	0,9	1,1	0,9	0,9	0,9	0,9
IV. Monthly average pensionable earnings (€)	3 915	4 209	6 463	8 658	12 271	18 360
V. Sustainability/Adjustment factor	1	1	1	1	1	1
VI. Average number of months paid the first year	5,9	6,6	7,9	8,3	8,6	8,6
Monthly average pensionable earnings / Monthly economy-wide average wage	129,4%	108,6%	120,4%	113,6%	113,3%	119,4%

Source: Commission services, Insee Destinie model, calculation: DG Trésor
**New pension expenditure equals the product of II, III, IV, V, VI & VII*

Table 13c - Disaggregated new public pension expenditure (old-age and early earnings-related pensions) – FEMALE

	2019	2030	2040	2050	2060	2070
Projected new pension expenditures (million EUR)*	1 940	3 705	5 829	7 920	9 973	13 395
I. Number of new pensioners ('000)	337,7	424,1	419,7	412,1	371,6	353,0
II. Average contributory period	29,5	28,8	31,0	30,7	31,6	31,1
III. Average accrual rate (%)	1,4	1,5	1,2	1,3	1,2	1,3
IV. Monthly average pensionable earnings (€)	2 347	3 105	4 841	6 363	9 233	11 846
V. Sustainability/Adjustment factor	1	1	1	1	1	1
VI. Average number of months paid the first year	5,9	6,7	7,4	7,6	7,6	7,7
Monthly average pensionable earnings / Monthly economy-wide average wage	77,6%	80,1%	90,2%	83,5%	85,3%	77,0%

Source: Commission services, Insee Destinie model, calculation: DG Trésor
**New pension expenditure equals the product of II, III, IV, V, VI & VII*

We do not consider the number of pensions but the number of pensioners. Indeed, it is possible in France to be a poly-pensioner and to receive more than one pension from different schemes. It is then more realistic to take into account the number of pensioners instead of number of pensions.

Also, as we said in the introduction of the country fiche, French pensions are build by a Defined Benefit and a Point system. As we take into account the number of pensioners instead of number of pensions we have to only consider the new pension expenditures related to Defined Benefits (DB) systems and not Point systems (PS).

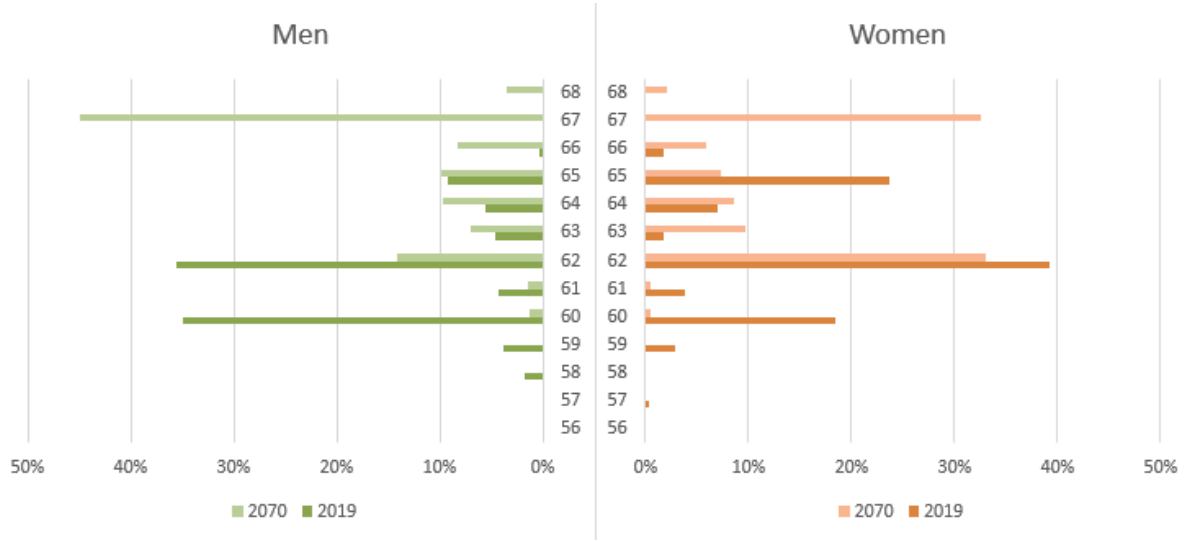
1. The contribution period, which equals here the number of years a person earns a labour income, is stable over the horizon of the projection (decreasing for men and increasing for women). The delayed entry in the job market due to the increasing duration of studies (Graph 4.a) balances the increase in the required contribution period. The increase in the duration of education for post-war generations was accelerated by some policy changes, like the increase of the minimum age of mandatory education from 14 to 16 for children born after 1953[23]. The distribution of ages of the new pensioners does move up for both men and women between 2019 and 2070, reflecting the effects of the recent pension reforms (Graph 4.b).
2. Pensionable earnings follow the progression of wages of individuals along their career. The increase of the average amount of monthly pensionable earnings is thus linked to productivity gains.
3. The average accrual rate gives an insight of the ratio between the average replacement rate at retirement, and the average contributory period for the entire career. Its value is higher for women than for men mainly for three reasons:
    a) There is a contributory minimum pension in the private sector as well as in the public one. It is provided by the main pension schemes and it should not be confused with the "Allocation de Solidarité pour les Personnes Âgées", which is a social assistance benefit financed by the public old-age solidarity fund (FSV – Fonds de Solidarité Vieillesse). The contributory minimum pension is attributed to people who meet the conditions for a full pension. It is called “Minimum contributif” (or Mico) for private sector employees, “Minimum garanti” (or Mingar) for public sector employees. This minimum pension benefits to people who have earned low revenues (and/or who have worked part-time). Thus, beneficiaries from this minimum pension have a relatively higher accrual rate, since they receive a higher pension compared to what they have contributed for. A bit less than one fifth of private sector employees are entitled to the contributory minimum. Around two thirds of women are entitled to the contributory minimum against only 4 men out of 10, as women have lower revenues on average. This leads to a higher average accrual rate for women.
    b) Women also tend to benefit more from other redistributive elements than men (especially maternity leave bonuses) which raises their average accrual rate compared to men.
    c) By design, high-wage earners tend to have a lower accrual rate in France as only revenues below the social security ceiling are factored into the calculation of the benefit. Thus, pensions of high-wage earners are lower relative to their wage for workers with high salaries than for low-income earners, which implies a lower accrual rate. Since wages are on average higher for men than for women, it contributes to a lower accrual rate for men.

Finally, the number of new pensioners is not expected to increase significantly over the projection period and is expected to remain close to the number of new pensioners per year observed over the past 10 years (cf. Table 14.a). The population is expected to age at a relatively fast pace over the first half of the projection period (cf. evolution of the old-age dependency ratio) but the effect of the 2014 reform

[23] Executive order of 6 January 1959

(progressive increase of the minimum contributory period required for being granted a full pension before the age of 67) will keep the number of new pensioners contained[24]. During the second half of the projection period (2035-2070), the population ageing process is expected to slow down, keeping the number of new pensioners per year relatively stable.

Figure 4 - New pensioners – Breakdown by age and sex



Source: Insee, DESTINIE model, calculations: DG Trésor

[24] The projections are made upon the assumption that individuals retire as soon as they are entitled to a full pension.

Table 13.a1 Number of new pensioners 2004-2018

in '000	Men	Women	All
2004	422	326	748
2005	386	330	716
2006	416	373	789
2007	427	398	825
2008	429	413	842
2009	351	388	739
2010	371	407	778
2011	313	368	681
2012	298	307	605
2013	374	384	758
2014	348	354	702
2015	327	326	653
2016	323	320	643
2017	353	354	707
2018	360	385	745

Source: La retraite et les retraités, Panoramas de la Drees, 2020

For the breakdown of new public pension expenditures by type of scheme, cf. annex F.

3.4. Financing of the pension system

In 2020, contribution rates to the general basic pension scheme stand at 10.45% of the gross wage below the Social Security Ceiling (1 SSC = € 3 428 per month in 2020) for employers and 7.30% for workers in the main basic scheme.

Besides contributing to the main basic scheme, executive and non-executive private sector workers contribute to AGIRC-ARRCO at a 3.15% rate on the basis of the part of their wage below one SSC (the contribution rate is 4.72% for the employer), and at a 8.64% rate for the part of their wage between one and eight SSC (respectively 12.95% for their employer).

Non-executive workers also contribute to AGFF at a 0.80% rate (1.20% for their employer) on the basis of the part of their wage below one SSC and at a 0.90% rate for the part of their wage between one and three SSC (respectively 1.30% for their employer). Executive employees contribute to the general scheme, to ARRCO (with respect to wage up to the ceiling), to AGFF, to another exceptional complementary contribution CET and to AGIRC (for wage between 1 and 8 times the ceiling).

Civil servants' contribution rate is 11.10% (employee) of their gross wage. In reality (and not in the projections, cf. infra), the contribution rate of the State is determined and adjusted every year so as to balance the public schemes.

Table 14 – Financing of the system

in 2020 NB: 2020 Social Security Ceilling (SSC) : 41 136€ / 2020 gross minimum wage: 18 473€	**Public sector employees***		**Private sector employees****		**Self employed*****	
	Basic scheme	**Complementary scheme**	**Basic scheme**	**Complementary scheme********	**Basic scheme**	**Complementary scheme**
Contribution base	Gross salary (traitement indiciaire + NBI). Excluding bonuses.	Bonuses, up to 20% of "traitement indiciaire"	Gross annual salary including some types of bonuses	Gross annual salary including bonuses	Non-salaried work-related gross income	
Contribution rate	85,38%	10,00%	17,75%	7,87% up to 1 SSC, 21,59% from 1 to 8 SSC	10,10%	The contribution rate varies depending on type of activity
Employer	:	:	10,45%	4,72% up to 1 SSC, 12,95% from 1 to 8 SSC	:	:
Employee	11,10%	5,00%	7,30%	3,15% up to 1 SSC, 8,64% from 1 to 8 SSC	:	:
State	74,28%	5,00%	:	:	:	:
Other revenues	Pensions reserve fund and old-age solidarity fund		Pensions reserve fund and old-age solidarity fund		Pensions reserve fund and old-age solidarity fund	
Maximum contribution (annual in 2020)	:	The contribution base cannot be higher than 20% of the gross salary (traitement indiciaire)	There is no ceilling: for revenues above the SSC, the contribution amouts to 2,3%	27 424 €	205 680 €	:
Minimum contribution (annual in 2020)	:	:	In order to validate one quarter per year of contribution (the minimum that can be validated per year), an employee must earn at least 150 times the hourly minimum wage (1522,5€ in 2020) over the year.	:	478 €	:

**Militrary excluded, **non-executive employee earning less than the social security ceiling, ***self-employed earning less than the social security ceiling, craftsmen, tradesmen and lawyers excluded, ****AGFF included.*

Source DG Trésor

Only the contributions strictly speaking (i.e. collected on labour income) have been projected, in accordance with AWG guidelines (Table 15). As requested by the Commission, the implicit contribution rates are kept constant in the projection interval: as a result, the share of employer and employee contributions will remain stable. The State also pays a contribution as the employer of civil servants.

The number of contributors is a little bit higher than the number of employment. Indeed, in France there is a pension called AVPF, offered by the State to people taking care of children or disabled people. This help insures old-age earning rights to AVPF pensioners. Therefore, they are not part of the employment but still of the contributors (which is paid actually by the State).

Table 15 – Revenue from contribution (EUR millions), number of contributors in the public scheme (in 1000), total employment (in 1000)

	2019	2030	2040	2050	2060	2070	change 2019-2070 (pps)
Public pension contributions (%GDP)	11,8	11,5	11,5	11,5	11,6	11,6	-0,2
Employer contributions	*5,5*	*5,6*	*5,7*	*5,7*	*5,7*	*5,7*	*0,2*
Employee contributions	*3,8*	*3,8*	*3,9*	*3,9*	*3,9*	*3,9*	*0,1*
*State contribution**	*2,5*	*2,1*	*2,0*	*2,0*	*2,0*	*2,0*	*-0,5*
*Other revenues**	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Number of contributors (I) (1000)	28322,4	28960,3	29268,7	29236,4	29125,4	28997,5	675,1
Employment (II) (1000)	27566,1	27869,4	28010,2	28016,8	27826,1	27641,2	75,1
(I) / (II)	1,0	1,0	1,0	1,0	1,0	1,0	0,0

Source: Commission services; Insee, DESTINIE model, calculations: DG Trésor
**only legislated contributions are reported*

3.5. Sensitivity analysis

In order to assess the sensitivity of pension schemes to different economic assumptions, 12 sensitivity tests have been carried out. Definitions of these sensitivity tests and graphs of the evolution of pension expenditures under these scenarios are given in appendix G.

- Higher life expectancy scenario: public pension expenditures as a share of GDP are 0.6 point higher in 2070 than in the baseline scenario (Table 17). In this scenario, pensioners live longer and earn a pension during a longer period.
- Under the higher productivity scenario, pension expenditures are driven up as a result of higher productivity assumption but GDP increases even more: impact on the public pension expenditure-to-GDP ratio is negative, since in 2070 the ratio is expected to be lower by 1 point than in the baseline scenario. On the contrary, under the lower productivity scenario, the public pension expenditure-to-GDP ratio is 1 point higher in 2070 than in the baseline scenario.
- Higher employment rate of older workers scenario: the public pension expenditure-to-GDP ratio is 0.3 point lower than in the baseline scenario in 2070. Pension expenditures are higher in this scenario as older workers have better carreers but the increase in pensions is more than compensated by an higher GDP.
- Migration-related scenarios:
    - Under the higher migration scenario, the public pension expenditure-to-GDP ratio is 0.3 point lower than in the baseline scenario in 2070.

- Under the lower migration scenario, the public pension expenditure-to-GDP ratio is 0.2 point higher than in the baseline scenario in 2070.

- Under the low fertility scenario, the smaller cohorts after 2019 lead to a lower labour force after the mid-thirties, which decrease GDP and raise the pension expenditure-to-GDP ratio by 1.8 point in 2070.

- Covid-19 scenarios:
  - Under the temporary shock scenario, the public pension expenditure-to-GDP ratio is 0.1 point higher than in the baseline scenario in the short term, before stabilizing in the mid-term and recovering in the long term as a result of lower public pension expenditures.
  - Under the permanent shock scenario, there is a sustainably lower potential growth which implies an increase in public pension expenditure-to-GDP ratio also in the medium and long term. Pension expenditures and GDP are negatively affected by the shock, but the effect on GDP dominates.

- The Linking retirement age to change in life expectancy scenario links the minimum and statutory retirement age to increases in life expectancy after 2022, when the 2010 reform reach its full effect. The reference contributory period is unchanged. The increase in the effective retirement age leads to lower pension expenditures, the average pension being slightly higher but served on a shorter period. On the contrary under the unchanged retirement age scenario public pension expenditure-to-GDP ratio is higher than in the baseline scenario.

- Declining benefit ratio scenario: average pension to average earned income ratio is limited to decline less than 10% over the projection horizon when compared to 2019, which leads to an increase in the pension expenditure-to-GDP ratio by 3.4 points in 2070.

Table 17 - Public and total pension expenditures under different scenarios (pps deviation from the baseline)

	2019	2030	2040	2050	2060	2070	Change 2019-2070
Baseline (% GDP)	**14,8%**	**15,6%**	**15,2%**	**14,3%**	**13,4%**	**12,6%**	**-2,2%**
Higher life expectancy at birth (+2y)	0,0%	0,2%	0,3%	0,4%	0,4%	0,6%	0,6%
Higher Total Factor Productivity growth (+0.4 pp)	0,0%	-0,1%	-0,5%	-0,8%	-1,0%	-1,0%	-1,0%
Lower Total Factor Productivity growth (-0.4 pp)	0,0%	0,0%	0,2%	0,6%	0,7%	1,0%	0,9%
Higher employment rate of older workers (+10 pp)	0,0%	-0,4%	-0,4%	-0,4%	-0,3%	-0,3%	-0,3%
Higher migration (+33 pp)	0,0%	0,1%	-0,1%	-0,1%	-0,1%	-0,2%	-0,2%
Lower migration (-33 pp)	0,0%	0,2%	0,1%	0,2%	0,1%	0,2%	0,2%
Lower fertility (-20 pp)	0,0%	0,0%	0,2%	0,7%	1,1%	1,8%	1,8%
Temporary Shock Covid-19	0,0%	0,1%	0,0%	0,0%	-0,2%	-0,1%	-0,1%
Permanent Shock Covid-19	0,0%	0,4%	0,7%	1,2%	1,4%	1,6%	1,6%
Linking retirement age to change in LE	0,0%	-1,1%	-1,9%	-2,3%	-2,4%	-2,6%	-2,6%
Unchanged retirement age	0,0%	0,4%	0,9%	1,2%	1,6%	2,2%	2,2%
Declining benefit ratio	0,0%	0,0%	0,6%	1,8%	2,7%	3,4%	3,4%

Source: Commission services ; Insee, DESTINIE model

3.6. Description of the changes in comparison with the 2006, 2009, 2012, 2015 and 2018 projections

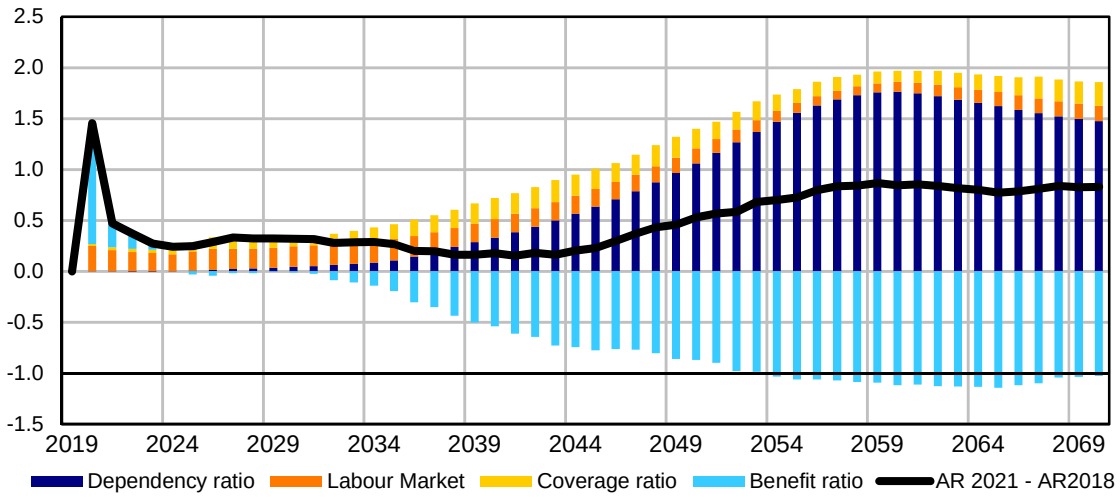
Public pension expenditures as a share of GDP are projected to decrease over the projection period (Table 18) as it is projected by French institutions (Conseil d'orientation des retraites, Institut national de la statistique et des études économiques), but to a lesser extent. Compared to the 2018 exercise, the new demographic (lower fertility rate, higher life expectancy) and macroeconomic (lower growth rate) assumptions explain the revision (Graph 5.1).

Table 18 - Change in the public pension expenditure to GDP ratio and disaggregation for consecutive projection exercises (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)	1,98	*8,69*	*-1,79*	*-3,52*	*-0,93*	*-0,48*
2009 Ageing Report (2007-2060)	1,01	*8,40*	*-2,20*	*-4,03*	*-0,51*	*-0,66*
2012 Ageing Report (2010-2060)	0,54	*9,15*	*-3,53*	*-3,08*	*-1,23*	*-0,76*
2015 Ageing Report (2013-2060)	-2,76	*6,75*	*-3,17*	*-4,73*	*-1,20*	*-0,41*
2018 Ageing Report (2016-2070)	-3,30	*6,16*	*-2,91*	*-4,78*	*-1,43*	*-0,33*
2021 Ageing Report (2019-2070)	-2,17	*7,08*	*-1,99*	*-5,90*	*-0,99*	*-0,36*

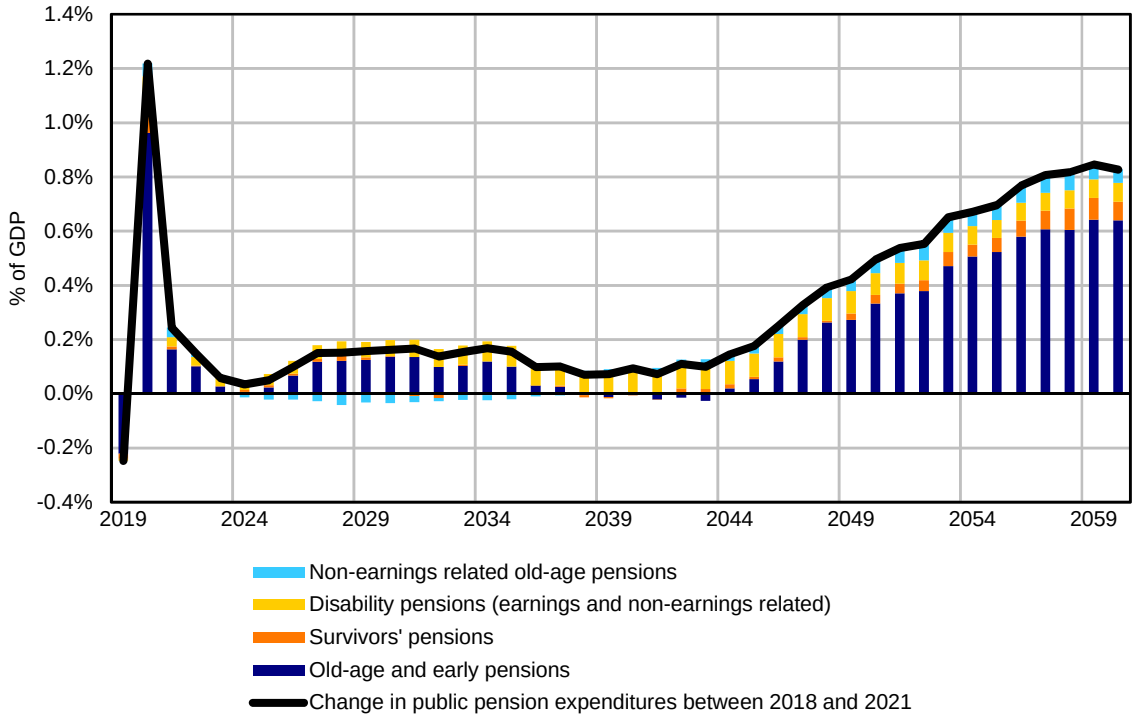
Source: Commission services based on French projections
Explanatory note: Please note that the four components do not add up because of a residual component.The projection horizon has been extended over consecutive Ageing Reports, limiting compatibility over time.

Figure 5.1 - Decomposition of the change (%) in pension expenditures to GDP between the 2018 and the 2021 exercises (disability pensions excluded)



Source: Commission services, Insee, Destinie model, calculations: DG Trésor

Figure 5.2 - Decomposition of the change (%) in public pension expenditures to GDP between the 2018 and the 2021 exercises - by type of pension

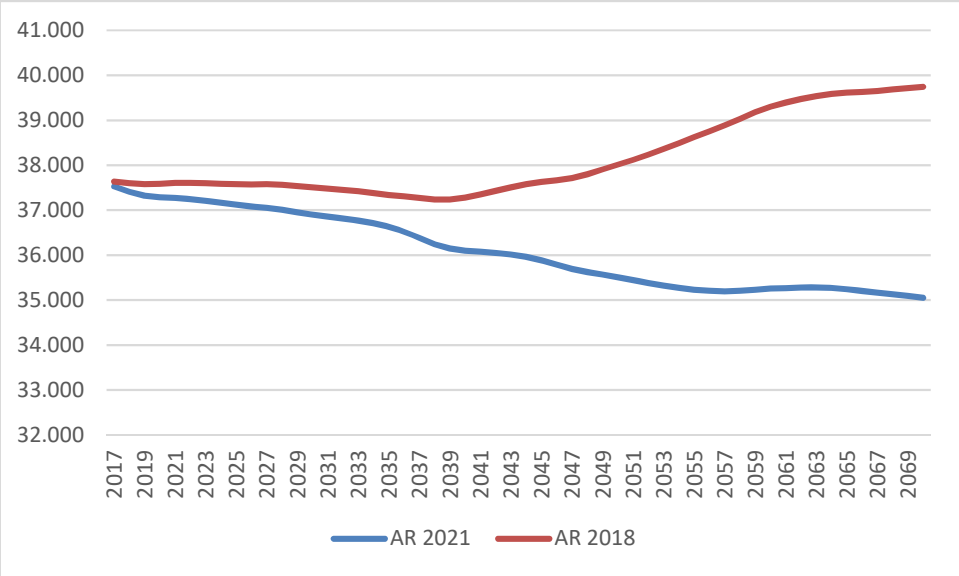


Source: Commission services, Insee: Destinie model, calculations: DG Trésor

The deterioration is mainly linked to the dependency ratio which has been revised upwards compared to 2018 (Graph 5.4). The assumption of a lower fertility leads to a decrease in the projection of the population between the age of 20 and 64 (Graph 5.3). Unlike in the previous exercise, the fertility rate is not high enough to offset the aging of the numerous people born between 1945 and 1975. As a result, the dependency ratio keeps raising after 2040.

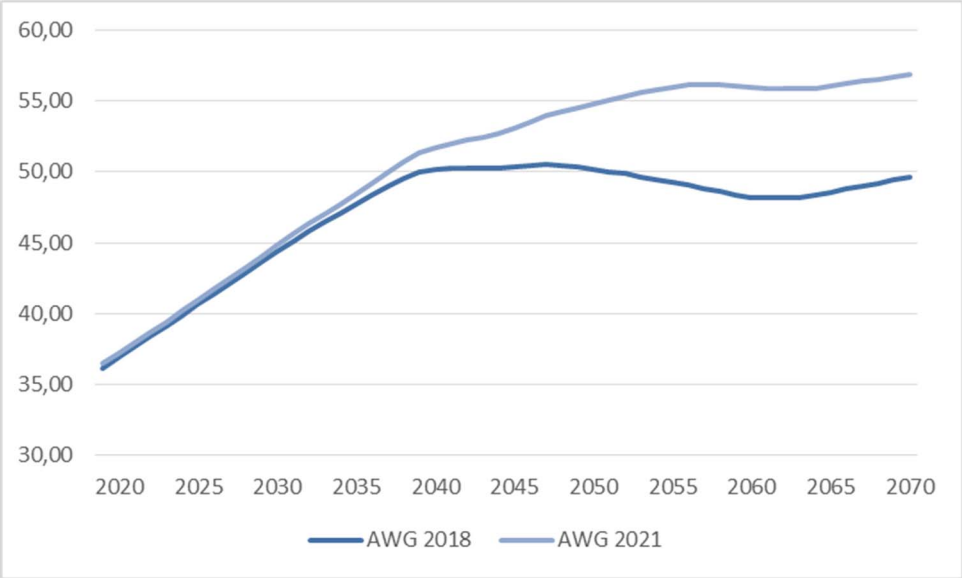
Lower births can no longer compensate for the aging of the baby boomer. Consequently, the active population keep on falling and the dependency ratio keeps on rising after 2040. This phenomenon outweighs the evolution of other factors that contribute to containing expenditures, notably the downward revision of the coverage ratio (retirees among those over 65) and after 2034, the downward revision of the macroeconomic replacement rate (relative level of the average pension compared to the average wage). The labor market indicator (ratio of the population aged 20-64 years old to the employed population) is revised downwards due to the decline in the working age population.

Figure 5.3 - Working age population (20-64) – 2018 and 2021 projections



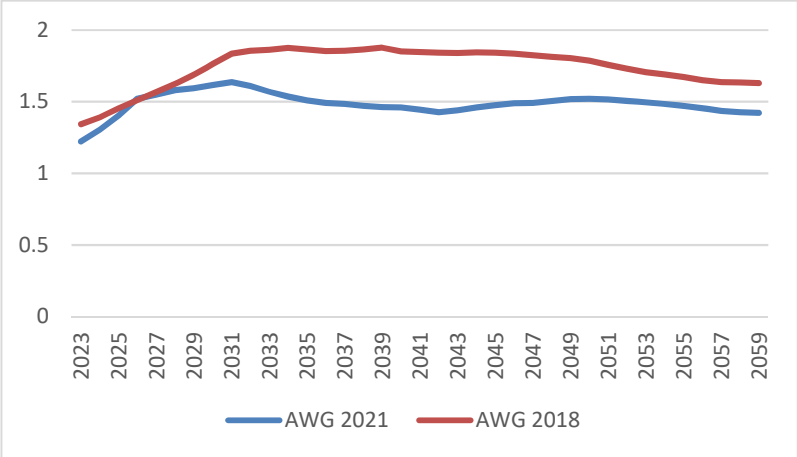
Source: Commission services, DG Trésor

Figure 5.4 - Dependency ratio – 2021 and 2018 projections



Source: Commission services, DG Trésor

A lower projected growth rate – mainly due to lower projections for participation rates - also contributes to a higher public pension expenditure-to-GDP ratio.



On the contrary, the benefit ratio is lower than in the previous projection exercise after 2034 (Graph 5.1) because of a decrease of the average pension. The shorter-term benefit ratio is higher due to a decline in the average income. The coverage ratio has been revised downwards over the whole forecast period because of lower participation rates which lead the workers to extend their career in order to obtain a full pension.

The increase of the non-earnings related old-age pension's expenditures to GDP (Graph 5.2) is linked to a higher number of pensioners which exceeds the decline in the average old-age minimum pension.

Table 19 shows that changes in assumptions are the main drivers of the revision compared to the 2018 projections. Reforms also play a role but to a lower extent while the changes related to the new indexation rule of the non-contributory minimum pension (ASPA) have only a small impact.

Table 19a - Disaggregation of the difference between the 2018 projections and actual public pension expenditure in 2016-2019 (% GDP)

	2016	2017	2018
Ageing Report 2018 projections	15,05%	15,03%	14,98%
Assumptions (pps of GDP)	0,25%	0,17%	0,28%
Coverage of projections (pps of GDP)	-0,28%	-0,27%	-0,20%
Constant policy impact (pps of GDP)	0,04%	0,00%	-0,16%
Policy-related impact (pps of GDP)	0,00%	0,00%	0,00%
Actual public pension expenditures	15,07%	14,93%	14,90%

Source: Insee, Destinie model, calculations: DG Trésor

Table 19b - Decomposition of the difference between the 2018 and the new public pension projections (% GDP)

	2019	2030	2040	2050	2060	2070
Ageing report 2018 projections	15,01	15,45	15,08	13,76	12,54	11,75
Change in assumptions (pps GDP)	*0,34*	*0,94*	*0,94*	*1,14*	*1,41*	1,47
Improvement in the coverage or in the modelling	*-0,60*	*-0,80*	*-0,87*	*-0,66*	*-0,60*	-0,66
Change in the interpretation of constant policy	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	0,03
Policy related changes	*0,02*	*0,02*	*0,02*	*0,02*	*0,01*	0,01
New projection	14,76	15,61	15,17	14,25	13,37	12,60

Source: Insee, Destinie model, calculations: DG Trésor

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

4.1. Institutional context in which the projections are made

Several French institutions have developed pension projection models:

- Since the mid-1990s, the **French statistical institute** (Insee – Institut national de la statistique et des études économiques) has developed a dynamic microsimulation model called "Destinie".
- The **Ministry of social affairs** recently built up a microsimulation model called "Trajectoire".
- The **Institut des politiques publiques** (IPP), a scientific partnership between the Paris school of economics (PSE) and the Center for research in economics and statistics (Crest), has developed a dynamic microsimulation model of the pension system called PENSIPP.
- Most **pension schemes** have developed their own projection model. Some of these models project the entire pension system, like Prism created by the main private sector scheme (Cnav – Caisse nationale d'assurance vieillesse);
- The **Conseil d'orientation des retraites** (COR – French pension advisory council) carries out projections on a regular basis. The last projections[25] were published in November 2020, using projections from all schemes.

All these projection models are often peer-reviewed, mainly during the working groups set up by the COR.

As for the *2018 Ageing Report*, the French Treasury has worked in cooperation with the French Statistical Office using its dynamic microsimulation model, Destinie. This microsimulation model, developed in the 90s, is a reference[26] concerning pension expenditures projections. The Destinie model has been used for scientific studies whose results have been published in professional publications[27] [28] as well as peer-reviewed journals[29] [30]. It has also been used for public and officical reports[31].

With regards to disability pensions, the projection model is the same as the one used for the *2018 Ageing Report*. This projection methodology has been developed by the French Treasury.

4.2. Data used to run the model

Old-age and survivors' pensions projection: Destinie

The main input database is the 2018 Household Wealth Survey "Enquête Patrimoine 2017-2018" produced by Insee. Data are collected from more than 20,000 households and provide comprehensive

[25] «Evolutions et perspectives des retraites en France», 26 November 2020, COR, https://www.cor-retraites.fr/sites/default/files/2020-12/Fusion_rapport%2Bsynth%C3%A8se_0.pdf

[26] Other models like Prism (Cnav), Pensipp (IPP), or Promess (the ancestor of Trajectoire at the Ministry of social affairs) are similar to Destinie Model.

[27] Bachelet, M., A. Leduc, A. Marino, « Les biographies du modèle Destinie II : rebasage et projection », Working paper n° G 2014/01, Direction des Etudes et Synthèses Economiques, February 2014.

[28] Marino, A., « Vingt ans de réformes des retraites : quelle contribution des règles d'indexation ? », Insee Analyses n°17, April 2014.

[29] 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.

[30] 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.

[31] Rapport de la Commission Moreau pour l'avenir des retraites, « Nos retraites demain : équilibre financier et justice », June 2013.

information on the household situation (professional and family biography, income and financial situation, etc.). The model also relies on additional surveys which provide complementary information on the labour market, or the population structure:

- Labour Force Survey (1990-2014, « Enquête emploi en continu »),
- « Échantillon interrégime de cotisants » (survey conducted by the Ministry of Social Affairs),
- Training and vocational skills survey (2015, « Enquête formation et qualification professionnelle »).
- So called « Generation surveys » (Enquêtes generation) that focus on early carreer and transition from school.

Disability pensions:

For disability pensions, the initial profile for recipients and average amount of the disability benefits come from the administrative dataset of the Health insurance schemes which delivers the earning related pensions, and from the CNAF (Caisse nationale des allocations familiales - national family insurance fund) which delivers non earnings-related disability benefits.

4.3. General description of the model

Old-age and survivors' pensions projection: Destinie

The Destinie model is a dynamic microsimulation model whose main application is the analysis of pension policies and forecasting. In 2010, an updated version has been developed. This model has two separate modules: (a) a generator of demographic and employment biographies and (b) a pension simulator. The model takes accurately into account the household's level and not only the individual's one.

(a) Biography generator

The first module produces full individual (demographic and professional) biographies (except the transition towards retirement) up to 70 years old (or the age of death in case). Using the data from the "Enquête Patrimoine 2010" as a starting point, the professional and family trajectories are projected until 2070 according to transition probabilities estimated on the basis of observed data collected from another source (see data used, 4.2).

For each individual in the sample, many variables are simulated, for instance:

- wage path estimated through wage equations (depending for instance on schooling level);
- kinship ties, which determine survivors' pensions;
- unemployment and inactivity periods based on the estimation of transitions' matrix on the labour market;
- membership to different pension schemes

The sample of the Household Wealth Survey is representative of the French society with regards to:

- age and gender,
- levels of education (by generation),
- composition of households (number of children, birth/age of the mother, etc.).
- activity and unemployment rates by age and gender

Starting from the computed biographies, the model calculates the age of retirement for each individual of the sample, assuming that people retire as soon as they meet the conditions for a full pension.

(b) Pension simulator

The second module is devoted to pension computation. The model is quite flexible and several parameters can be changed: retirement behaviour, indexation of pensions, legislation scenario, etc. For the AWG exercise, pensions have been computed according to the legislation prevailing in 2020.

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.

4.4. Assumptions and methodologies applied

Old-age and survivors' pension projection: Destinie

Sample size

The sample is composed of 65 000 individuals in 2017, with a sampling rate close to 1/1000.

Pension calculation

Since there are 35 pension schemes, Destinie covers only the main ones:

- the public sector pension scheme (FPE for civil servants in state administration, military, CNRACL for local administration or hospitals), including the complementary part;
- the private sector pension scheme (the regime general Cnav);
- an aggregate of self-employed pension schemes (like SSI);
- an aggregate of the two point system schemes for the private sector: the complementary pension scheme Agirc-Arrco for managers employed in private sector (Agirc), or private sector employees (Arrco);
- one survivor's pension scheme: this pension groups all survivors' pension schemes, but applies specific rules for private and public sector;
- one minimum pension scheme.

Destinie computes the first pension of the individual and makes it increase under indexation on CPI assumption consistently with the current legislation. In general, indexation rules and parameters can be modified by the user.

Survivors' pensions calculation

Survivors' pensions are also projected using the microsimulation model.

The Destinie model simulates the evolution of the characteristics of individuals and families, and in particular the evolution of the marital status: separations, pairing of singles into couples, births, etc. The model computes an individual probability of getting into a certain state, depending on the previous state and individual characteristics.

Since the Destinie model does not distinguish between marital status, every couple is entitled to survivors' pensions. In real life, it is not the case: marriage provides rights for survivors' pensions, but not the PACS (civil solidarity pact) for instance. As a consequence, the model overestimates a little the projections of survivors' pensions.

The rules related to survivors' pensions differ between pension schemes. For instance, for simplicity reasons, the model Destinie does not split the survivor's pension of a deceased individual between the different former spouses or husbands he/she had (as it is the case in the main pension schemes). Other rules specific to the public sector pension scheme, like the duration of the wedding, children, etc., are not taken into account either.

Disability pensions

For disability pensions, the initial profile for recipients and average amount of the disability benefits come from the administrative dataset of the Health insurance schemes which delivers the earning related pensions, and from the CNAF (Caisse nationale des allocations familiales - national family insurance fund) which delivers non earnings-related disability benefits.

The total amounts are recalculated using the results of the social welfare accounts. The total number of beneficiaries is recalculated using exhaustive information published by the Ministry of Solidarity or the organizations in charge of the payment of benefits.

4.5. Additional features of the projection model

Additional model's characteristics (simulation of careers, simulation of the average exit age of studies and entry age in the labour market, computation of wage equations, etc.) can be found in the 2014 professional publication (in French): Bachelet, M., A. Leduc, A. Marino, « Les biographies du modèle Destinie II : rebasage et projection », Working paper n° G 2014/01, Direction des Etudes et Synthèses Economiques, February 2014.

The sample of the population used to feed the Destinie model includes people living in France only, but pensioners living abroad are included ex-post applying a constant coefficient of 1,06 as they respresent 6% of total French pensioners. Similarly, we proceed to three other ex post adjustments regarding old-age pensions, survivors and minimum pensions to fit social security accounts balance. As for disability pensions, no ex-post adjustments are made since the data initially used includes living abroad disability pensioners.

5. Appendix

A. Methodological annex

Economy- wide average wage at retirement

The average gross wage at retirement is calculated using the average last monthly wage of new pensioners.

Table A.1 – Economy wide average wage at retirement evolution (in EUR)

	2019	2030	2040	2050	2060	2070
Economy-wide average wage	3025,15	3877,18	5368,71	7622,16	10825,72	15375,84
Economy-wide average wage at retirement	3247,64	4183,62	7165,56	9393,27	14644,08	21607,67

Source: Insee, DESTINIE model, calculations: DG Trésor

Pensioners vs Pensions

The individuals can cumulate several pension schemes depending on their careers: thus, the number of pensioners is lower than the number of pensions.

In the model Destinie, pensioners can receive several pensions:

- Up to three defined benefit pensions (base pension scheme). In reality, there are much more than three pension schemes but for simplification purposes only three categories are distinguished:
  - the public sector pension scheme (FPE for civil servants in state administration, military, CNRACL for local administration or hospitals),
  - the private sector pension scheme (the regime general Cnav),
  - one for other pension schemes (like SSI);
- one point system schemes (complementary pension scheme), for instance, the Agirc-Arrco for managers employed in private sector Agirc, or private sector employees Arrco. The different point system schemes are modelized by one general point system scheme.
- one survivor's pension. Indeed, if the deceased husband or wife had several pensions, the surviving wife or husband may also have the corresponding survivor's pension. We decided to count one survivor's pension at maximum for those individuals.
- one minimum pension.
- one disability pension. After the age of 62, earnings-related disability pensions are considered as old-age pensions. After the age of 65 (age at which it is possible to start receiving the non-contributory minimum pension), we suppose that individuals who used to receive a non-earnings related disability pension also receive an old-age pension.

The ratio of pensions over pensioners raises from 2 in 2016 to 2.3 in 2070. This increase is due to the fact that people are more likely to work in various sectors during their careers, which in turn raises the probability of receiving several pensions.

Table A.1b – Pensions vs pensioners in 1000

	2019	2030	2040	2050	2060	2070
Number of pensioners (I)	19029,91	21571,50	23019,50	23664,23	23882,93	23996,20
Number of pensions (II)	39302,10	46703,04	51828,99	54453,75	55503,13	55937,67
Ratio (II)/(I)	2,07	2,17	2,25	2,30	2,32	2,33

Source: Insee, Destinie model, DG Trésor

Disability pensions

There are three types of disability pensions in France. Two of them are earnings-related: the "rente Accident du Travail et Maladie Professionnelle" (ATMP) and the "Pension d'Invalidité" (PI). The last one, "Allocation aux Adultes Handicapés" (AAH) is a non earnings-related minimum disability pension. In France, new disability pensions are aimed at insured individuals under the retirement age (and only one type of disability pension (ATMP) is still being granted after entry into retirement) so the increase of life expectancy has a limited influence on disability pensions. As a consequence, the ratio of the number of recipients over the whole population is supposed to be constant over time. In that sense, the projection looks like the demography scenario of the Long Term Care methodology.

The level of new earnings-related disability pensions grows in line with the average wage. As for non earnings-related benefits, they are price indexed.

Table A.2 – Disability rates by age groups (%)

	2016	2030	2040	2050	2060	2070
-54	5%	5%	5%	5%	5%	5%
55 - 59	14%	14%	14%	14%	14%	14%
60 - 64	6%	8%	8%	8%	8%	8%
65 - 69	2%	2%	2%	2%	2%	2%
70 - 74	1%	1%	1%	1%	1%	1%
75+	1%	1%	1%	1%	1%	1%

Source: Commission services, DG Trésor

Survivors' pensions

The Destinie model simulates biographic situations, and in particular the evolution of the marital statuses: separation, weddings, births, etc. One should note that the Destinie model does not distinguish between marital statuses: marriage provides rights for survivors' pensions, but

not the PACS (civil solidarity pact) for instance. Therefore, every couple is supposed to be married, which may result in an overestimatation of the number of survivors' pensions.

In the projections, survivors' pension expenditures as a share of GDP decrease (from slightly over 1.6% in 2016 to a bit more than 0.8% in 2070). There are three explanations to this trend:

- the reduction of the gap between life expectancies of women and men: survivors' pensions concern women for an overwhelming majority, and this reduction of the gap between life expectancies might reduce the period of payment of survivors' pensions.
- the relative increase of women employment and participation rates: survivors' pensions are means-tested in the main basic scheme for private sector employees: due to the evolution of women's careers, fewer women are expected to meet the means condition for being eligible to a survivors' pension in the future. Moreover, as survivors' pensions top revenues up to a certain ceiling, women eligible to survivors' pensions in the future are likely to be granted a smaller amount of money on average, as their revenues are expected to be higher on average in the future.
- the decreasing trend of marriage rate: it automatically reduces the number of people eligible to a survivors' pension.

Other explanations (smaller age gap between spouses, increased number of second and third weddings, etc.) might also influence survivors' pensions, but they are not taken into account.

Compared to the 2018 projection exercise, the way the number of recipients of a survivor pension is calculated has been changed : in 2018, the number of pensioners included only pensioners who didn't receive an old-age pension. As a result, the number of pensioners of each category could be added up to get the total number of pensioners, but these figures could not be used to calculate the average survivor pension. In the 2018 projection, for each type of pension, the number of pensioners is the number of pensioners receiving that type of pension: as a result, the numbers of pensioners don't add up. But, the average survivor pension does represent the average additional income received by surviving spouses. These methodological changes do not have an impact on survivor pension expenditures.

The same holds for the number of recipients of the non contributory minimum pension.

Non earnings-related minimum pensions

The ratio between non earnings-related minimum pensions and GDP increases from 0.15% in 2016 to 0.28% at the end of the 2030's, decreases slightly to 0.2% in the following decade and then remains stable around that level over the rest of the projection period. The number of minimum pensions and pensioners increases on average until 2040, is relatively stable between 2040 and 2060 and increases again slightly from 2060 onwards. These variations are mostly related to the evolution of the number of people aged 65+, which will increase at a sustained but decreasing pace in the first half of the projection period, will not increase between 2040 and 2060 and will start increase again from 2060 onwards. Until 2050, the value of the social

assistance benefit is indexed to prices as per the French legislation. After 2050, the minimum pension is indexed to wages, as agreed with the Commission.

Contributions

Alternative pension spending disagregation

Most of the time, individuals have to contribute both to a basic and complementary schemes, all of them compulsory. Moreover, old-age insurance is organized on a socio-professional principle. It entails two consequences: first, people tend to benefit from more than one pension (basic + complementary) and, second, given their career, they can benefit from more than one basic pension. Therefore, focusing on the number of pensions instead of the number of pensioners (Table 9.b) is not appropriate in the French case because people can cumulate several pensions (cf. Annex A), which is difficult to interpret. In the model, the coverage ratio effect is really low between 2040 and 2070, mostly due to the fact that the average number of pensions by pensioner increases during the projection period. Indeed, people are more likely to work in various sectors during their careers because of the expected rise in labour mobility, which in turn rises the probability of cumulating several pensions. On the contrary, the benefit ratio effect is even more negative because the average amount of pension is lower than the average amount of pension by *pensioner*.

Table A3- Factors behind the change in public pension expenditures between 2019 and 2070 (in percentage points of GDP) – pensions

	2019-30	2030-40	2040-50	2050-60	2060-70	2019-70
Public pensions to GDP	0,8	-0,4	-0,9	-0,9	-0,8	-2,2
Dependency ratio effect	3,4	2,3	0,9	0,3	0,2	7,1
Coverage ratio effect*	-1,1	-0,6	-0,1	-0,1	-0,1	-2,0
Coverage ratio old-age	-0,1	-0,1	0,0	0,0	0,0	-0,2
Coverage ratio early-age	-1,3	-1,7	0,0	-0,5	-0,2	-3,7
Cohort effect	-3,0	-2,2	-1,1	0,0	-0,1	-6,5
Benefit ratio effect	-1,0	-1,6	-1,4	-1,1	-0,9	-5,9
Labour market effect	-0,3	-0,4	-0,2	0,0	0,0	-1,0
Employment ratio effect	-0,2	-0,3	-0,2	0,0	0,0	-0,6
Labour intensity effect	0,0	0,0	0,0	0,0	0,0	0,0
Career shift effect	-0,2	-0,1	-0,1	0,0	0,0	-0,4
Residual	-0,2	-0,1	0,0	0,0	0,0	-0,4

Administrative data on new pensioners

Tables A4 show the number of new old-age, disability, survivor and minimum Pension ASPA pensioners by age group and sex across all pension schemes for the year 2018, produced by the statistical office of the Ministry for Solidarity and Health, Drees. These numbers are estimated using administrative data collected from the largest pension schemes on a yearly basis and a survey of pensioners and demographics. An adjustment on the margin is used to reconcile the data source.

To get those results for the year 2018, Drees considered all new pensioners who received their first ASPA between 01/01/2018 and 12/31/2018. Therefore, only and strictly 2018 new pensioners are counted. Those who asked earlier or even received later are not in the results. Moreover, pensioners who deceased during the year 2018 were not counted. So were the pensioners who were suspended of ASPA in 2018.

In 2018, most of pensioners took up their old-age pensions between age 60 and 62. The minimum pension age is 62 and the possibilities of early-retirement will be reduced by the increase of the contributory period needed for a full pension (cf. 1.2), so fewer retirement before 62 are expected in the near future. Men tend to retire before women, as their higher employment rate enable them to complete the required contributory period at a younger age.

Table A4a – Number of new pensioners by age group in 2019 (administrative data) – men

Age group	All	Old-age	Disability	Survivor	Other (including minimum)
15 - 49	5209	4789	0	420	0
50 - 54	3204	2716	0	488	0
55 - 59	19008	16770	0	2238	0
60 - 64	279610	269694	0	2435	7481
65 - 69	62067	55724	0	384	5959
70 - 74	3650	2728	0	68	854
75+	2149	218	0	1184	747

Source: European Commission

Table A4b – Number of new pensioners by age group in 2019 (administrative data) – women

Age group	All	Old-age	Disability	Survivor	Other (including minimum)
15 - 49	3174	884	0	2290	0
50 - 54	3813	948	0	2865	0
55 - 59	30833	13029	0	17804	0
60 - 64	274724	255881	0	11666	7177
65 - 69	86867	76978	0	3268	6621
70 - 74	5926	1818	0	2942	1166
75+	20607	1380	0	17121	2106

Source: European Commission

Table A4c – Number of new pensioners by age group in 2019 (administrative data) – Total

Age group	All	Old-age	Disability	Survivor	Other (including minimum)
15 - 49	8383	5673	0	2710	0
50 - 54	7017	3664	0	3353	0
55 - 59	49841	29799	0	20042	0
60 - 64	554334	525575	0	14101	14658
65 - 69	148934	132702	0	3652	12580
70 - 74	9576	4546	0	3010	2020
75+	22756	1598	0	18305	2853

Source: European Commission

B. Retirement ages of the French pension system

Generation	**Minimum ages for early pension***	**Legal age**	**Full rate pension age****
Before July 1st 1951	56-59	60	65
July 1st- Dec 31th 1951	56-60	60 + 4 months	65 + 4 months
1952	56-60	60 + 9 months	65 + 9 months
1953	56-60	61 + 2 months	66 + 2 months
1954	56-60	61 + 7 months	66 + 7 months
1955	56+4 months-60	62 months	67 months
1956	56+8 months-60	62	67
1957	57-60	62	67
1958	57+4 months-60	62	67
1959	57+8 months-60	62	67
1960 onwards	58-60	62	67

** Depending on the contribution time of the insured person (going from the reference time + 8 quarters for the youngest retirement age, to the reference time only for the oldest retirement age) and on the age at which people started working.*

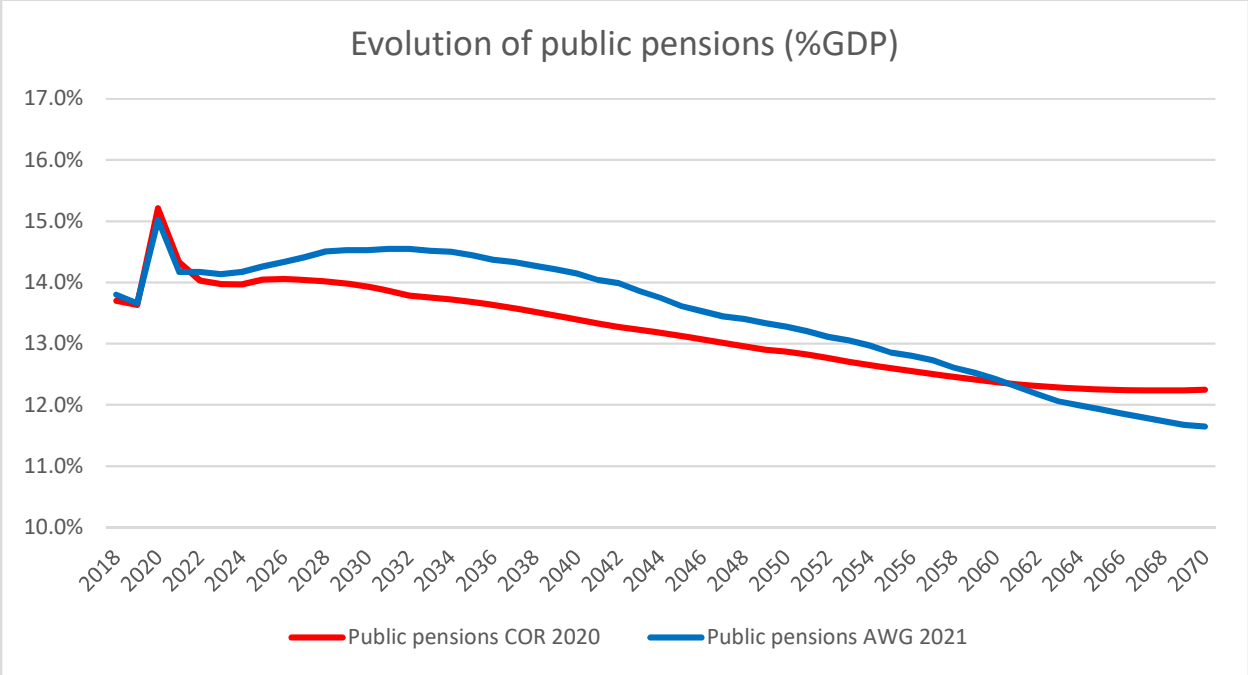
For instance, someone born in 1960 can retire at age 58 only if he/she started working at 16 and has validated 174 quarters; or at age 60 if he/she started working at 18 and has validated 166 quarters; etc.

C. Full pension contribution period

Generation	Required number of contribution years
Before 1948	40 years
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
1961 to 1963	42 years
1964 to 1966	42 years and 3 months
1967 to 1969	42 years and 6 months
1970 to 1972	42 years and 9 months
1973 onwards	43 years

D. Pension expenditures projected by other institutions

Graph D.1 - Public pension expenditures (excluding disability) projected by other institutions



Source: Insee (DESTINIE model) and COR projections; calculations: DG Trésor

We present a decomposition of the differences between the 2021 AWG and the 2020 COR (French pension advisory council) exercises. The benefit ratio and the labour market ratios are slightly different than in the country fiche decomposition, as the figures for the number of hours worked are not available in the COR assumptions. We replaced the number of hours worked by the number of employees[32]. The factors are the ones below:

$$\textbf{Dependency ratio} = \frac{\text{Population 65+}}{\text{Population 20-64}}$$

$$\textbf{Coverage ratio} = \frac{\text{Pensioners}}{\text{Population 65+}}$$

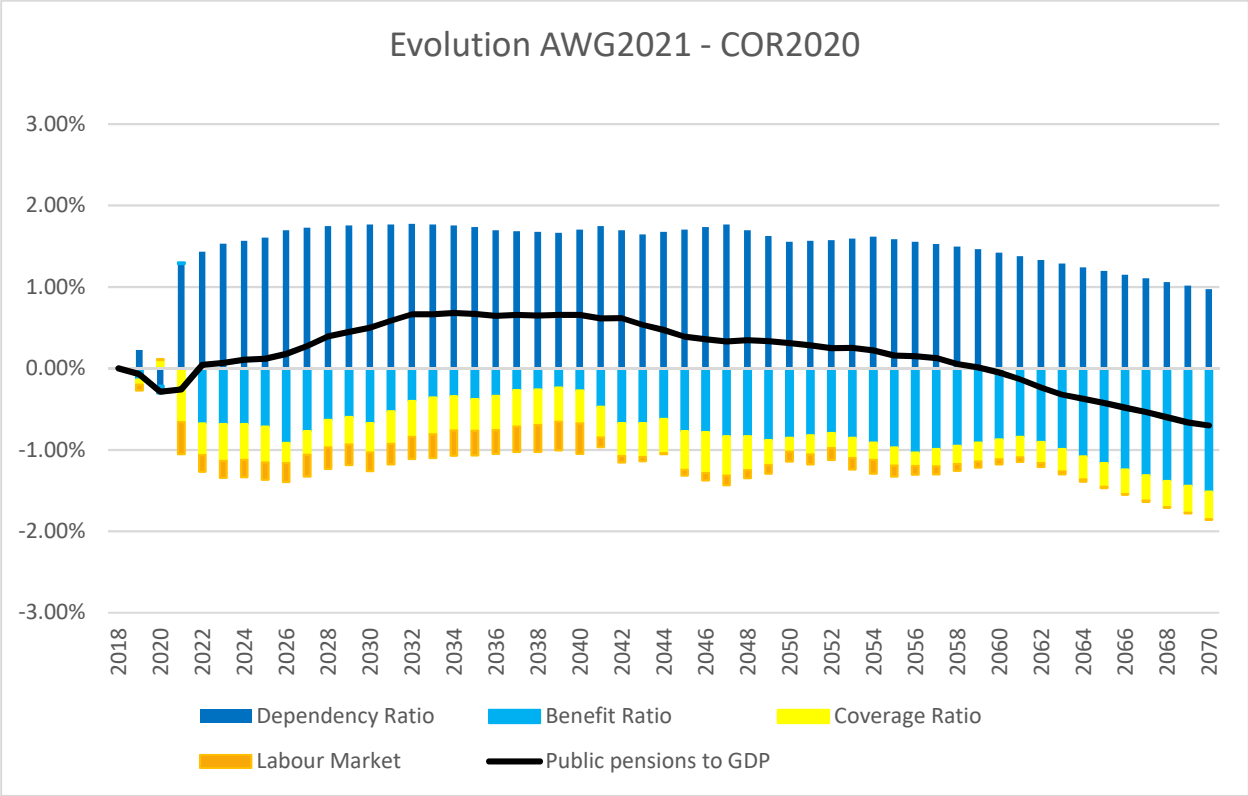
$$\textbf{Benefit ratio} = \frac{\text{Average pension by pensioner}}{\text{Average GDP per employee}} = \frac{\text{Pension expenditures} / \text{Number of pensioners}}{\text{GDP} / \text{Number of employees}}$$

$$\textbf{Labour market} = \frac{\text{Population 20-64}}{\text{Number of employees}}$$

[32] Thus the small effect of the evolution of the number of hours worked by employee is neglected in this decomposition.

The decomposition of the differences in the public pension expenditures[33] between the AWG and the COR projections is presented in Graph D.2.

Graph D.2 - Differences in the evolution between the results of the 2020 COR exercise (based on a productivity assumption of 1.5%) and the 2021 AWG exercise (baseline scenario excluding disability pensions)



Source: Insee (DESTINIE model) and COR projections; calculations: DG Trésor

In this graph we study the difference between the gap of each year AWG projection to 2018 AWG projection, and the gap of each year COR projection to 2018 COR projection.
One of the main differences between the two projection exercises stems from demographic assumptions: the Eurostat assumptions has changed the projections of life expectancy and fertility. Based on these assumptions, the dependency ratio will continue to increase until 2045 before declining until 2070.

Over the medium term, differences between the coverage ratios also explain the divergent path of the two projections. These differences come mostly from the fact that the modeling techniques used by the COR and the French Statistical Office are not the same: the COR aggregates projections made by the statistical services of each scheme while the French Statistical Office makes projections based on a sample of households and observed data. The evolution of the benefit ratio diverges between the two exercises during the projection period, which is due to lower productivity growth rate assumptions in the AWG exercise.

At the beginning of the projection period, both AWG and COR pension expenditures increase with a slightly higher jump observed regarding COR expenditure, since the decline in GDP modelled by the COR linked to the Covid-19 crisis is slightly larger than for the AWG scenario. From 2022 onwards we observe higher public pension expenditures in the AWG scenario when compared to

[33] To be as consistent as possible with the COR projections' field, disability pensions have been excluded, but minimum pensions are included as they are also taken into account in the COR projections.

the COR, before a reduction of the gap and a reversion by 2060. This evolution is related to several factors:

- Fertility and Total Factor Productivity (TFP) growth assumptions are higher and consequently more advantageous in the COR scenario, implying lower expenditures when compared to the AWG scenario. However, the gap between the COR and AWG TFP growth assumptions shrinks over the projection period, implying a decline in expenditures smaller over time when compared to the AWG scenario.
- This decline in expenditures, which is smaller over time, is outweighed by a higher life expectancy and a lower migration in the COR scenario, with both leading to an increase in the COR expenditures relative to the AWG projections.
- Furthermore, we observe that employment rate of older workers is higher in the COR scenario when compared to AWG one up to 2055 before dropping below the AWG's employment rates, which implies lower pension expenditures in the COR scenario up to 2055 and then an increase in expenditures from 2055 onwards regarding COR scenario.

E. Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions)

Table F.1 – Decomposition of new pension expenditures: computation of the main variables

New pension expenditures P	$P = \sum_{i=1}^{N} p_i$ where p_i is the annual pension of the new pensioner i provided by Destinie.
Number of new pensioners N	Provided by Destinie.
Average contributory period (in years) $\bar{d}$	$\bar{d} = \frac{1}{N} \sum_{i=1}^{N} d_i$ where d_i is the number of years of a positive wage for the new pensioner i (whose complete wage series is provided by Destinie).
Average number of months paid the first year $\bar{m}$	$\bar{m} = \frac{1}{N} \sum_{i=1}^{N} m_i$ where m_i is the number of months of pension paid to the new pensioner i the first year (provided by Destinie).
Defined benefits schemes	
Monthly average pensionable earning $\bar{w}$	Computed using the 25 best year wages (series provided by Destinie) as $\bar{w} = \frac{1}{N} \sum_{i=1}^{N} w_i$ where $w_i = \frac{1}{25} \sum_{t=0}^{T} \mathrm{I}_{w_{i,t}} w_{i,t} (1+\nu_t)^{T-t}$ and ν_t is the CPI and $\mathrm{I}_{w_{i,t}} = 1$ if $w_{i,t}$ is one of the 25 best yearly wages of the individual i.
Average accrual rate $\tilde{a}$	Computed so as to resolve $P = N \times \bar{d} \times \bar{w} \times \bar{m} \times \tilde{a}$. Thus $\tilde{a}$ is close but not equal to $\bar{a} = \frac{1}{N} \sum_{i=1}^{N} a_i$ where a_i is defined by: $\frac{p_i}{m_i} = \sum_{t=0}^{T} w_{i,t} (1+\nu_t)^{T-t} \; a_i$[34].
Point system schemes	
Total pensions points at retirement $\bar{p}$	$\bar{p} = \frac{1}{N} \sum_{i=1}^{N} p_i$ where p_i is the number of pensions points acquired by new pensioner i at retirement (provided by Destinie, Agirc points are converted into Arrco points using the respective points value in both schemes).
Point value *V*	Service value in the Arcco scheme
Point cost *K*	Purchase value in the Arcco scheme multiplied by the adjustment factor applied to contributions (125% then 127% after 2019)
Adjustment factor $\bar{\tau}$	Computed so as to resolve $P = N \times \bar{p} \times \bar{V} \times \bar{m} \times \bar{\tau}$. Thus $\bar{\tau}$ is close but not equal to 1.

[34] With this definition: $p_i = m_i \times d_i \times w_i \times a_i$.

Table F.2 - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) - Defined-benefit schemes

	2019	**2030**	**2040**	**2050**	**2060**	**2070**
Projected new pension expenditures (million EUR)*	4014	7481	11 601	16 972	20 621	31 831
I. Number of new pensioners ('000)	621,9	804,4	772,7	803,3	698,4	737,8
II. Average contributory period	33,0	31,1	32,8	32,7	32,8	33,0
III. Average accrual rate (%)	1,1	1,2	1,1	1,1	1,0	1,0
IV. Monthly average pensionable earnings (€)	3 077	3 633	5 5848	7 490	10 656	15 244
V. Sustainability/Adjustment factor	1	1	1	1	1	1
VI. Average number of months paid the first year	5,9	6,6	7,6	8,0	8,1	8,2
(Monthly average pensionable earnings) / (Monthly economy-wide average wage)	101,7%	93,7%	104,0%	98,3%	98,4%	99,1%

Source: Insee, DESTINIE model, calculations: DG Trésor

Table F.3 - Projected and disaggregated new public pension expenditure (old-age and early earnings-related pensions) - Point systems

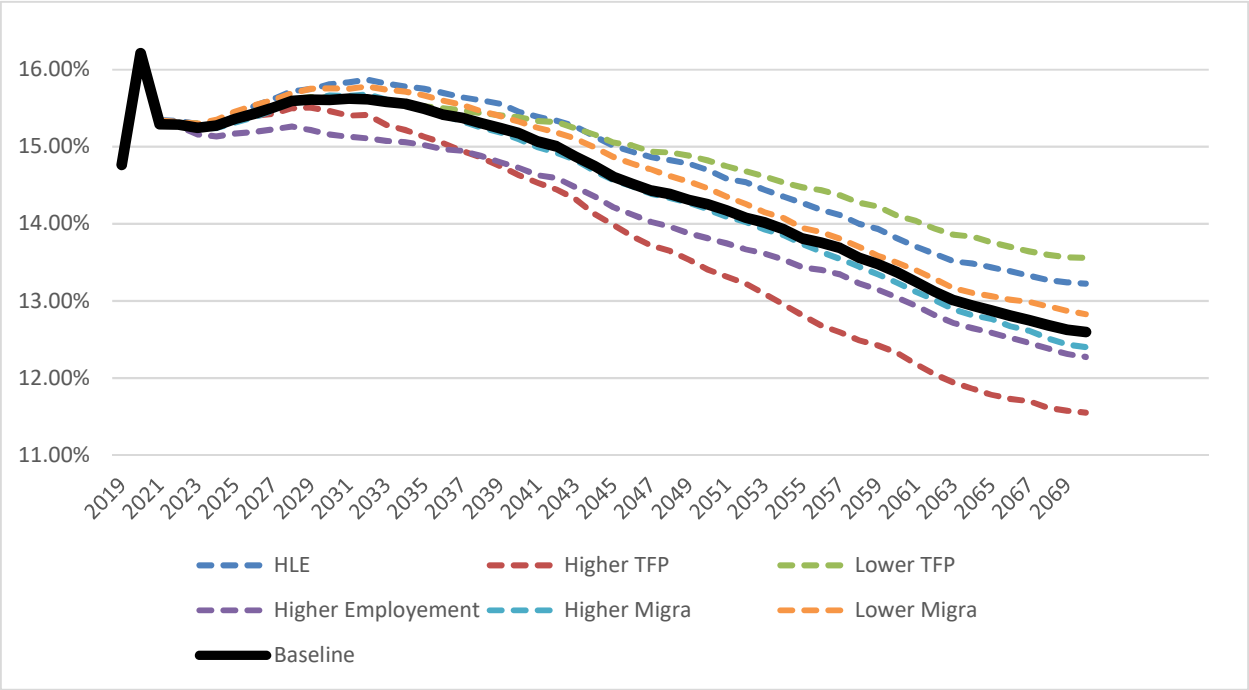
	2019	2030	2040	2050	2060	2070
Projected new pension expenditure (mln €)	1816,4	2532,6	4682,6	7024,5	8564,5	11610,7
I. Number of new pensioners ('000)	556,3	707,2	707,2	756,3	668,9	694,0
II. Point value (EUR/month)	0,005	0,005	0,005	0,005	0,005	0,005
III. Average accrual rate	4221,5	4795,5	6751,2	8547,8	11736,4	15295,5
IV. Total pension points at retirement (by pension)	108119,4	*106399,1*	*160987,9*	*210321,2*	*288267,6*	*370897,9*
V. Average contributory period	25,612	*22,2*	*23,8*	*24,6*	*24,6*	*24,2*
VI. Sustainability/Adjustment factor	1,000	1,0	1,0	1,0	1,0	1,0
VII. Correction coefficient	0,931	0,9	1,0	1,1	1,1	1,0
VII. Average number of months paid the first year	5,921	6,66	7,66	8,02	8,14	8,29

Source: Insee, DESTINIE model, calculations: DG Trésor

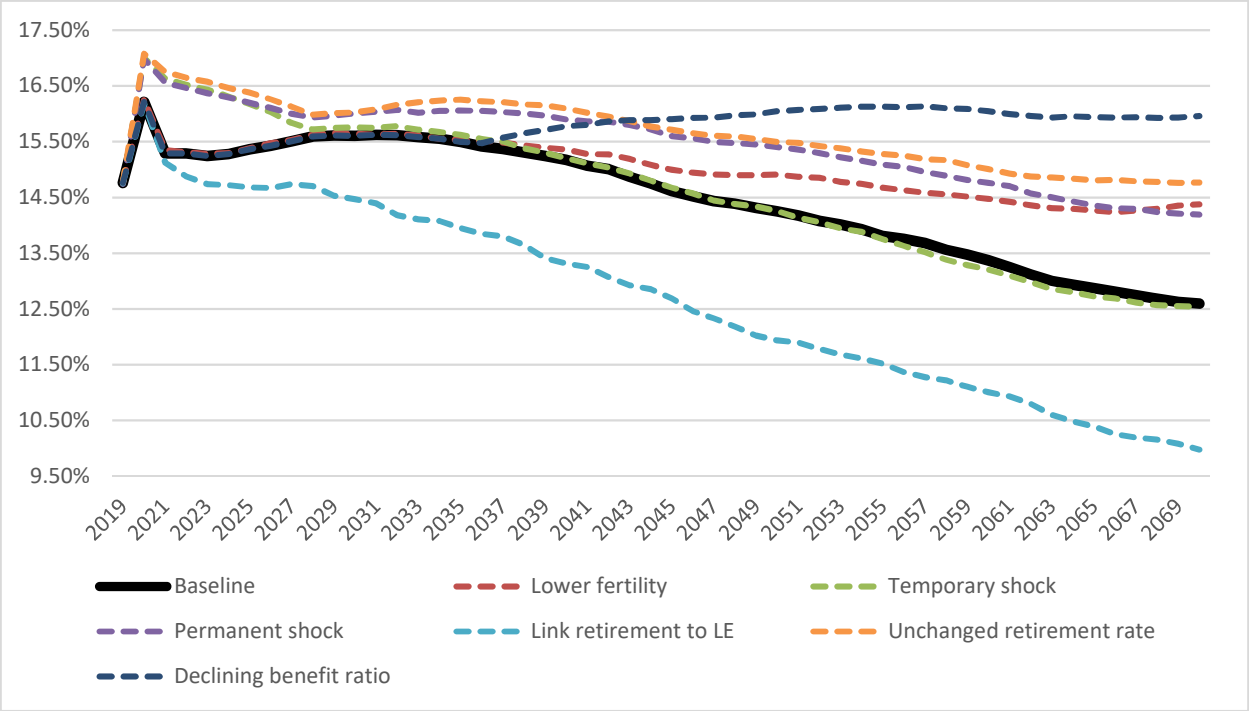
F. Overview of the sensitivity tests

Sensitivity test		Definition
1	**Higher life expectancy**	Increase of life expectancy at birth of two years by 2070 compared with the baseline projection.
2	**Higher total factor productivity growth**	Total factor productivity growth is assumed to converge by 2045 to a steady-state growth rate which is 0.2 percentage points higher than in the baseline scenario. The increase is introduced linearly during the period 2026-2045
3	**Lower total factor productivity growth**	Total factor productivity growth is assumed to converge by 2045 to a steady-state growth rate which is 0.2 percentage points lower than in the baseline scenario. The increase is introduced linearly during the period 2026-2045
4	**Higher employment rate of older workers**	The employment rate is 10 p.p. higher compared with the baseline projection for the age-group 55-74. The increase is introduced linearly over the period 2021-2030 and remains 10 p.p. higher thereafter. The higher employment rate of this group is achieved through a reduction of the inactive population.
5	**Higher migration**	A scenario whereby net migration flows are 33% higher than in the baseline scenario over the entire projection horizon
6	**Lower migration**	A scenario whereby net migration flows are 33% lower than in the baseline scenario over the entire projection horizon
7	**Low fertility**	A scenario whereby net fertility decreases by 20% over the entire projection horizon
8	**Linking retirement age**	The retirement age is shifted year-over-year in line with ¾ of the change in life expectancy at current retirement ages.
9	**Unchanged retirement age**	The early and statutory retirement ages, as well as career length require-ments, are frozen at the situation in the base year.
10	**Declining benefit ratio**	When the earnings-related public pension benefit ratio declines by more than 10% as compared to the base year level, pension indexation is increased to stabilise the benefit ratio.
11	**Permanent shock**	The impact of the Covid 19 crisis is modelled as permanent shock
12	**Temporary shock**	The impact of the Covid 19 crisis is modelled as temporary shock

Graph G.1 – Pension expenditures under various scenarios (% of GDP)



Graph G.2 – Pension expenditures under various scenarios (% of GDP)



G. Panorama of the main pension schemes

Source: GIP info retraite, www.info-retraite.fr

H. Glossary

CNAV: Caisse nationale d’assurance vieilesse

AGIRC: General association of complementary retirement institutions for executives / 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 Retraités des Agents des Collectivités Locales

RATP: Régie autonome des transports parisiens

SNCF: Société nationale des chemins de fer

CNIEG: Caisse nationale des industries electriques et gazières

SSI: Sécurité sociale independants

CNAVPL: Caisse nationale d’assurance vieilesse professions liberales

CNBF: Caisse nationale des bareaux français

RCI: Retraite complémentaire independants

CAVP: Caisse d'assurance vieillesse des pharmaciens

CARCDSF: Caisse Autonome de Retraite des Chirurgiens Dentiste et des Sages Femmes

CARPIMKO: la caisse autonome de retraite et de prévoyance des infirmiers, masseurs-kinésithérapeutes, pédicures-podologues, orthophonistes et orthoptistes

CARPV: Caisse Autonome de Retraite et de Prévoyance des Vétérinaires

CAVEC: Caisse d'assurance vieillesse des experts-comptables et des commissaires aux compte

CAVAMAC: Caisse d'Allocation Vieillesse des Agents Généraux d’assurance

CRN: Caisse de retraite des notaires

CAVOM: Caisse d’assurance vieillesse des officiers ministeriels, des officiers publics et des compagnies judiciaires

CIPAV: Caisse interprofessionnelle de prévoyance et d’assurance vieillesse

FPT : Fonction Publique Territoriale

FPH : Fonction Publique Hospitalière

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