Mechanisms of Male-Female Redistribution in the Pensions System: A Life Cycle Approach

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Abstract – In this article I propose to illustrate the gender redistribution achieved by the pensions system, primarily by using the return rate on contributions and studying representative cases of executive and non-executive employees born in the year 2000 and working in the private sector. The results indicate that the system broadly tends to redistribute wealth from men to women. In addition to direct solidarity measures, partial relief on pension contributions, the pooling of mortality risk and the architecture of the system itself all appear to have the effect of redistributing money from men to women, while the "25 best years" rule and the index-linking of wages to prices appear to have more ambiguous consequences. Solidarity measures appear to enhance the redistributive nature of the pension system (away from men and towards women), with the exception of the pension bonus for having three children, on account of their proportional nature. Finally, the 2023 reform appears to reinforce distribution towards the lowest-paid women.

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Keywords: pensions, redistribution, men-women

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Reducing pension inequality between women and men has been one of the stated objectives of the French pension system since the reforms of 2010 and 2014, and progress towards this goal is specifically monitored by the Pensions Advisory Council (French: *Conseil d'Orientation des Retraites*, or COR) and the Pensions Monitoring Committee (French: *Comité de Suivi des Retraites*). Since the pension reform of 2023, the goal of eliminating gender inequality by 2050 has been explicitly enshrined in Article L111-2-1 of the Social Security Code (Aubert & Bonnet, 2024).[1] In 2022, the average value of direct personal pensions received by women residing in France was 38% less than the average received by men. Nevertheless, this disparity is trending downwards: among retired people living in France at the end of 2020, the gap was 57% for the generation born in 1930, 40% for the generation born in 1946, and 30% for the generation born in 1955 (Cheloudko & Marino, 2024), with a higher rate of female participation in the labour market in the latter generation. Since the French pension system is broadly contributive, these disparities reflect career inequalities in terms of both duration (with women experiencing more frequent interruptions) and earnings level (with women receiving lower salaries and being more likely to work part-time) (Bonnet *et al.*, 2015). A very significant part of this inequality can be attributed to the demands of childcare, which has specific consequences for careers and earnings, and is more often handled by women than it is by men (De Saint Pol & Bouchardon, 2013). However, a certain portion of this inequality is offset by solidarity measures which accounted for 22% of total pensions paid to women (and 12% of those paid to men) in 2016 (Cheloudko *et al.*, 2020). Although women tend to draw smaller pensions than men, their life expectancy at time of retirement is higher because of a slightly earlier retirement age, and particularly because of their greater longevity. This gap is also following a downward trend: it was approximately 3 years for the 1954 cohort, compared with around 4 years for the generation born in 1930 (COR, 2024).

There are thus legitimate questions to be asked about the redistributive performance of the pension system between men and women across their whole life cycle. Are disparities in pension payments offset by the fact that women receive pensions over a longer period of retirement? And/or by the fact that they contribute less during their years of employment? In an effort to answer these questions, this article measures disparities in the rates of return of the pension rights accrued by men women, using representative cases from the private sector and honing in on the different mechanisms at work: differences in life expectancy, contribution rates, the treatment of family benefits, etc.

In the first Section I describe the specificities of the pension system in matters of redistribution – when we adopt a life cycle perspective – and the indicators used to measure redistribution. The second section is devoted to the methodology employed, explaining why it is suited to analysing the redistribution achieved by the pension system. In the last two sections I present my results: Section 3.1 examines the influence of each of the mechanisms associated with the rules governing pension entitlements and calculations (before the application of solidarity measures), while Section 3.2 considers the contribution of solidarity measures to the redistribution of wealth between men and women. Finally, Section 4 focuses particularly on the implications of the 2023 pension reform.

1. Redistribution: The Special Case of Pensions

1.1. Redistribution and the Reduction of Inequality

For most social benefits, redistributive impact can be measured using a static framework, by comparing the income received from benefits against the income which would have been received without the benefits in question (a counterfactual scenario). However, this static approach is not suitable for analysing the pension system, on account of its dynamic nature: individuals make contributions throughout their time in employment, and receive benefits throughout their retirement. With this cross-cutting approach, the redistributive impact of the pension system may appear to be massive: the income received by elderly individuals increases from a very low level – essentially limited to income from assets and other transfers – to a level comparable to that earned by people in employment (COR, 2024). However, were the pension system not in place, individuals would necessarily accumulate much more substantial personal savings, in order to smooth their consumption over the course of their life cycle and cover their own longevity risk (Germain, 2021). Since the old age pension

1. Article L111-2-1 of the Social Security Code (version in application since 1st September 2023): 'The Nation also assigns to the distributive pension system the goal of advancing solidarity between generations and within each generation, particularly equality between men and women […]. The objective for the period to 2050 is to put an end to the disparity between the value of pensions received by women and those received by men, and, by 2037, to reduce that disparity to half of the level recorded in 2023."

constitutes a delayed salary paid out in return for earlier contributions, analysis of the system must encompass the full life cycle. This raises the question of which counterfactual scenario should be adopted.

We can thus consider, building upon the work of Blanchet (1996) or Coppini (1976), that, for a given generation, "*redistribution occurs when an individual pays into the system, or receives from it, more than might be mathematically expected."* As such, the relevant counterfactual scenario is one where the gross value of the pension received by a beneficiary is calculated on the basis of their past contributions, and the annual rate of return for their generation. This definition takes into consideration both the sums paid into the pension system by individuals in order to pay the pensions of their elders (contributions) and the sums they then receive when they themselves retire (pensions paid for, on a pay as you go basis, by younger generations).

A pension system can be said to be redistributive if the return on these contributions (the yield) is different for different individuals within a same generation. On the other hand, no redistribution occurs if the rate of return for all pensioners is identical to the mean value for their generation. This approach, used by Dubois & Marino (2015b) among others, is particularly well-suited to studying the redistribution induced by the pension system among pensioners of the same generation, from whom the system is at the same stage in its development, and the demographic and economic conditions are comparable.

However, this appreciation of the connection between contributions and pensions should not be confused with the inequality reduction approach which considers pensions with reference to wages. Given that individuals make contributions at different rates, any and all configurations become possible, as illustrated by the following examples: 1) a pension system may not achieve any redistribution but still attenuate inequalities in wages if the wealthiest individuals pay less into the system or, on the other hand, 2) it may be redistributive while exacerbating wage inequality, if those individuals who receive the highest returns contribute at a lower rate.

1.2. Redistribution Indicators

Although the replacement rate, usually defined as the ratio of first pension to final salary (or career average salary), is often used as a measure of the redistributive capacity of the pensions system, this indicator provides only a partial insight into equity at the individual level, since it includes neither the contributions paid by salaried employees across their professional careers, nor their life expectancy at retirement.

Two further indicators may thus be used to take the temporal dimension of retirement into account. The annuity rate thus corresponds to the ratio between the annual pension received by an individual and the sum total of their earned income over the course of their career. This indicator, used, for example, by Aubert & Bachelet (2012), nonetheless has the disadvantage of failing to include the length of time during which pensions are drawn, thus neglecting the potential redistribution induced by differential mortality. It also fails to provide any information as to the rate of contributions levied. The life cycle replacement rate (or benefit rate) overcomes some of these shortcomings by linking the discounted value of pension payments received during retirement to the discounted sum total of wages earned over the course of a career. However, this indicator still does not take account of the varying rates of contribution.

The internal rate of return (IRR), meanwhile, makes it possible to take this contributive dimension into consideration. It corresponds to the discount rate which, for a given individual, balances the discounted sum of contributions paid in against total pensions received across the whole life cycle. In terms of financial yield, this is equivalent to calculating the rate of interest which would need to be applied to an individual's contributions in order to guarantee a fixed return. Using a composite indicator of this kind does, however, have certain disadvantages: IRR does not allow us to determine whether or not the value of pensions is adequate. A high IRR may indicate that both the value of pensions and the replacement rate are low, depending on the rules governing pension entitlements and calculations. Furthermore, the extent of the redistribution achieved cannot be measured. Last but not least, IRR does not allow us to determine whether disparities in yield are to be attributed to disparities in contributions and/or to disparities in the total value of pensions and their duration of payment (cumulative value of pensions over their entire life cycle).

In this respect, the return rate on contributions (RRC), defined as the ratio of the adjusted sum total of pensions received during retirement to the adjusted sum total of contributions paid in over the course of a career, can be interpreted as the proportional relation between two easily identifiable indicators: the contribution rate (or average rate levied across the life cycle), or the

sum of contributions against the sum of all earnings, which allows us to ascertain whether or not the pension system demands the same level of contribution from all individuals, and the benefit rate (see above), which provides information regarding the attenuation or perpetuation of inequalities. RRC enables us to identify those pensioners who receive a higher return on their contributions than the rest of their generation (on average), and who thus feel the benefit of the redistributive mechanisms.

However, the result of the RRC calculation is dependent upon the adjustment hypothesis employed. The monetary values need to be adjusted before they can be added up, for example by deflating them to remove the inflationary effect or the annual variation in average wage per capita (AWPC, in French *salaire moyen par tête* - SMPT). This convention is followed here. This factor is of secondary importance when it comes to comparisons between pensioners from the same generational cohort, who have experienced similar economic conditions.[2] However, it becomes important in cases of incomplete careers: past wages and contributions become proportionally less important as the adjustment rate decreases and wages become more distant, leading to overestimation of the return rate on contributions. Of course, these two indicators of redistribution, IRR and RRC, are linked (see Appendix 1): IRR is the ratio which ensures that the RRC is precisely 100%. However, given two identical values for total earned income and total pension, irrespective of career trajectory and any potential discontinuities, the return rate on contributions will be identical, which is not the case with IRR (Glénat & Gleizes, 2004). Throughout the remainder of this article, these two indicators are calculated for my representative cases in order to illustrate, quantify and explain the gender redistribution effects induced by the pension system.

2. The Methodology Employed, and the Careers Analysed

2.1. The Representative Case Approach

In order to study the forms of redistribution effected by the pension system, and how they relate to different career trajectories, empirical studies generally prioritise either the analysis of real data by means of microsimulations, or else the use of representative cases. The latter method, employed in this study, provides a simple and comprehensible way of demonstrating the effects specific to different calculation rules, scales and solidarity measures, with regard to particular personal characteristics (career trajectory, number of children, life expectancy, etc.). The ease of use and controlled nature of these representative cases mean that they are ideal tools for assessing whether or not the pension system attains its stated objectives. Nonetheless, this approach is necessarily reductive since it does not allow us to take account of the variability and distribution of individual circumstances. It should thus be regarded as complementary to the microsimulation approach, and not a substitute for this method (SG-COR, 2012b). Within this remit, this article adds, by taking into consideration the consequences of the mortality differential between the sexes and the rate of contribution across their careers, to the results obtained by Aubert & Bachelet (2012) using microsimulations, measuring the variations in pension disparity (using interdecile ratios) before and after the application of the implicit and explicit mechanisms of the pension system. It also expands upon the results reported by Dubois & Marino (2015b), who studied the effects of the differential in life expectancy between the sexes on the returns obtained from the pension system (measured using IRR), successively neutralising the impact of individual effects and the rules of the pension system. It also brings nuance to the analysis published by the DREES regarding the microsimulation model 'Trajectoire' and the redistributive effects of the 2023 reform (COR, 2023) detailing the consequences of the principal measures introduced by this reform (raising the pension entitlement age, introducing pension bonuses involving time bonuses to extend contribution periods, and index-linking the minimum pension to the minimum wage).

This study limits itself to employees who spend their entire careers in the private sector, thus retiring with a single pension from the general scheme (CNAV) and the AGIRC-ARRCO supplementary scheme. Pension disparities between the sexes are greater in the private sector than they are in the public sector (Cheloudko & Marino, 2024), where women's careers are more likely to be continuous and, as such, more closely resemble those of their male colleagues (Bonnet *et al.*, 2015). Furthermore, the gender disparity in earned income, which encompasses imbalances in hourly wages, working hours and the number of paid working days per year, was 24.5% in the private sector in 2021, compared with 15.6% in the public sector.

2. When comparing different age groups, however, this choice is crucial because growth rates have a noticeable effect on the results (Dubois & Marino, 2015a).

Table 1 – **Characteristics of our representative cases**

Representative cases	Number of children	Age at which they entered the labour market (years)	Duration of contributions (years)	Mean salary (€ at constant values)	Career trajectory	AVPF
Female executive	0 or 3	22.75	43	76,075	1.45	No
Male executive	0 or 3	22.75	43	102,616	1.57	No
Female non-executive	0 or 3	22.50	43	26,778	1.31	No
Male non-executive	0 or 3	22.50	43	34,032	1.32	No
Female non-executive with brief break	0 or 3	22.50	37	24,681	1.28	Possible
Woman with long career break	0 or 3	22.50	9	18,299	0.62	No
Woman on minimum wage	0 or 3	20.00	43	21,717	1.21	Possible
Woman working part-time on minimum wage for 7 years	0 or 3	20.00	43	20,718	1.27	Possible
Woman working part-time on minimum wage	0 or 3	20.00	43	16,387	1.10	Possible

In order for this analytical exercise to be pertinent, the representative cases must be constructed, as far as possible, on the basis of careers which are sufficiently representative of real-life. Nine representative cases are studied here. The variables used are gender, total wages earned over the course of their careers, and the presence/absence of interruptions or periods of part-time work during their careers. For all representative cases, the age at which they entered the labour market is estimated using the average time worked before the age of 30 as calculated in the inter-scheme taxpayer sample (EIC 2017), corresponding to the first year in which social security contributions were paid for more than three quarters (Table 1).

The first four representative cases were constructed with reference to the representative cases for executives and non-executives working full careers in the private sector, as used by the COR. This approach sits somewhere between a purely theoretical approach (for example, a representative case involving a whole career worked for minimum wage) and a statistical approach which aims to reflect a certain number of real careers contained in the sample (for example, calculating the average career characteristics of pensioners in the first decile of pension rights). The COR representative cases were constructed with reference to the classification work done by the DREES and the CNAV, based on the individual career trajectories of beneficiaries of the general scheme born between 1935 and 1950. These are stylised representative cases which are easier to comprehend than the multiplicity of individual situations, without being entirely ad hoc in their construction (SG-COR, 2012a). The wages by age group for these representative cases are determined with reference to average wage per capita (AWPC), a constant value for each generation pegged to the 1962 generation for private sector employees, who in each age group are assumed to receive the average salary of the top decile in the wage distribution range (both men and women) for executives, and the bottom third for non-executives (SG-COR, 2023).

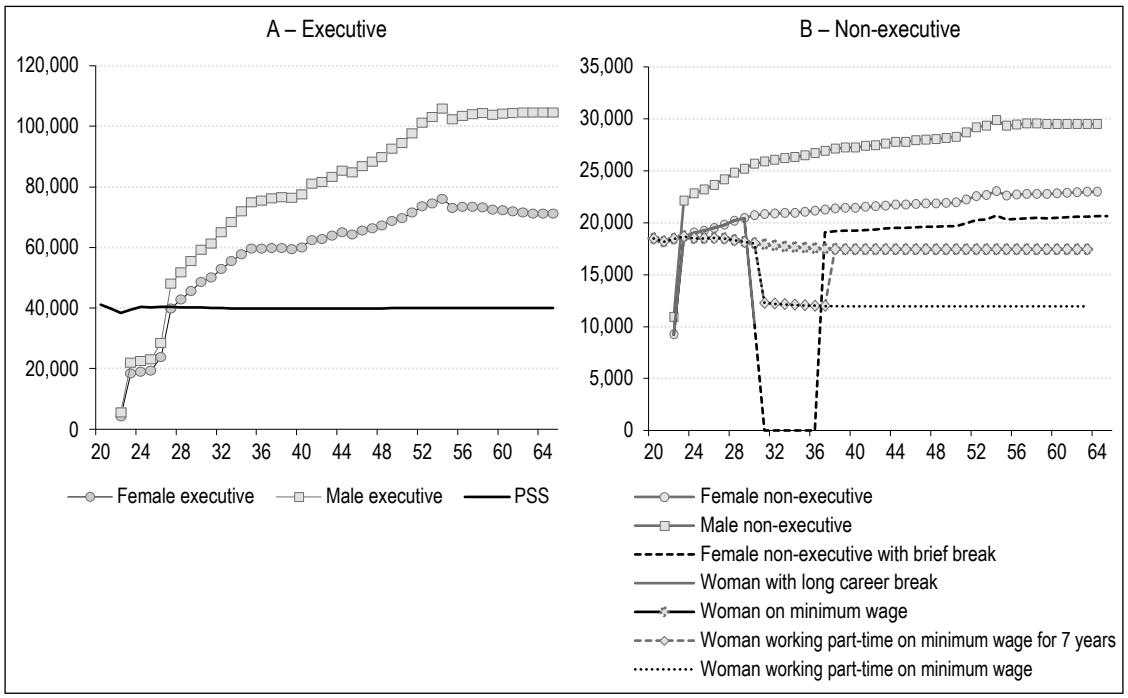
In order to take account of the wage disparities observed between women and men, these representative cases are split between the sexes. The approach adopted consists of combining observations of wage gaps in age groups and socio-professional categories (CS), in the private and semi-public sectors for employees between the age of 28 and 60, with the wage/age profile calculated for the generation born in 1962.[3] In practical terms, these calculations are performed in four phases. The first enables us to estimate an age effect for each category (CS), i.e. the mean absolute difference in women's earnings (compared with men) in relation to the average wage for all sexes and generations. In parallel, we estimate an annual effect for all CS and all ages between 1962 and 2021, with projections as far as 2070, assuming that the wage gap between the sexes will continue to shrink without disappearing completely in the long term. This annual effect is then applied to the age effect. Finally, these parameters for age, CS, age and generation are applied to the career profiles retained for executives and non-executives. The calculations focus on the generation born in the year 2000, currently entering the labour market.

3. These wage gaps are taken from the DADS data series for 2008-2022 (Source: INSEE).

The last five representative cases are more conventional. Non-executive women may thus take career breaks (periods without earned income) to raise their children, either temporarily (between the ages of 30.5 and 37.5), or else permanently. When returning to work, women in this situation earn salaries approximately 10% lower than those earned by women who continued to work. This wage gap was estimated with reference to Pora & Wilner (2019), who have evaluated the impact of parenthood on women's earnings. It corresponds to the average impact for women below the eighth decile of earnings, 5 years after the birth of their second child: 1) decline in hourly wage and 2) fewer hours worked. Finally, the last three representative cases correspond to full careers worked at minimum wage, either full-time or part-time. These representative cases only apply to women. Indeed, women are overrepresented among those workers receiving the minimum wage; 57% in 2024 (Expert working group on the minimum wage, 2024). They are also more likely to take part-time jobs (78% of part-time jobs are held by women), and these positions are more likely to be paid at minimum wage (38% compared with 12% of full-time jobs) (Magnier & Viossat, 2024).

Figure I summarises the earnings per age group of our nine representative cases, deflated by the average annual wage per capita.

Figure I – **Salaries of our representative cases by age, deflated for AWPC**



Source: Author's calculations, hypotheses COR 2024.

These representative cases may have between zero and three children. Finally, women with children who reduce their working hours or interrupt their careers may or may not be eligible for old-age insurance contributions for stay-at-home parents (French: *Assurance Vieillesse des Parents au Foyer*, or AVPF) (see Table 1).

These standard cases are based on the assumption that individuals will draw a pension at the full rate after working for 43 years, or at the age at which the early retirement penalty no longer applies (67) if they do not complete 43 years before the age of 67. The length of time for which pensions are received depends on life expectancy at retirement age, calculated for the 2000 generational cohort on the basis of the mortality hypotheses which form the basis of INSEE's 2021 demographic projections (Algava & Blanpain, 2021). Among other factors, disparities between the socio-professional categories are taken into account in the work of Blanpain (2016), who shows that in the period 2009-2013 a male executive at the age of 60 could expect to live, on average, 4.4 years longer than a male manual worker of the same age. Life expectancy estimates for executives and non-executives born in the year 2000, both male and female, were determined by the COR Secretariat-General by means of a conventional

projection of this disparity (SG-COR, 2021). Logically enough, the average life expectancy for executives is applied to the executive representative cases, with life expectancy for workers used for our minimum wage representative cases, while for our non-executive employee representative cases the life expectancy is taken from demographic forecasts, and thus corresponds to the "mean" life expectancy across all socio-professional categories.

2.2. Legislative Context and Hypotheses

For the past, I refer to the legislative conditions and scales which were actually in place. Subsequently, the parameters evolve to reflect current legislation and the effects of recent pension reforms (2010, 2014 and 2023) along with the AGIRC-ARRCCO agreements signed by the social partners, most notably in 2019 and 2023.[4] The economic hypotheses employed assume a long-term increase in productivity of 1.0% per annum in real terms from 2040 onwards (COR, 2024). This choice of scenario is not without implications for the scale of intragenerational redistribution, without necessarily undermining the conclusions.

With regard to the social and fiscal framework, the indicators are calculated on the basis of direct pension entitlements net of social contributions. The rate of CSG, which depends on the applicable rate of income tax, is calculated on the assumption that pensioners live alone and have no other income other than their pensions. The rate varies from one case to the next (CSG levied at the full rate of 8.3% for representative cases with a full career of full-time employment, reduced rate of 3.8% for the representative case working for minimum wage and ending their career working part-time, and no CSG for the representative case of a non-executive woman who stopped working at the age of 30.5).[5] The ASPA benefit (the solidarity allowance for elderly citizens, formerly known as the *minimum vieillesse*), paid subject to conditions concerning household income, has not been taken into consideration in this study.

With regard to contributions, I do not distinguish between employer and employee contributions. Since old age pensions are largely contributive, the share paid in by employers should ultimately be reflected in the net pension, just like the contribution deducted from the employee's wages (Bozio *et al.*, 2019). The partial relief on employer pension contributions for salaries between 1 and 1.6 x minimum wage was taken into account. This choice is debatable, because even if these contributions are not strictly paid into the pension system by the employers, the employees in question nonetheless accrue the same rights within the pension scheme. However, since these exemptions were introduced in order to boost recruitment of less qualified employees, they may be regarded as implicit solidarity measures. Moreover, since the financial compensation involved is largely sourced from consumption taxes, these resources are not directly funded by beneficiaries, unlike direct contributions, and are therefore excluded from my calculations. This approach tends to increase the value of the RRC (Dubois & Marino, 2015a). Nonetheless, it is possible to isolate its impact by comparing the indicators with and without the exemptions. Finally, private sector pensions schemes can make use of fiscal and budgetary resources and transfers from other schemes and funds (the old age solidarity fund [FSV], the family branch, UNEDIC) to fund certain solidarity measures which are not taken into consideration in this study.

3. Breaking Down the Factors Which Explain the Disparity in the Return Rate on Contributions for Women and Men

In order to better understand the specific effects of the calculation rules and solidarity measures in terms of redistribution between the sexes in the pension system, the method used here, which draws inspiration from Aubert & Bachelet (2012), consists of neutralising all of the mechanisms involved in the acquisition of pension rights and the calculation of pension entitlements, the mortality differential between women and men and the various solidarity measures (see Box for further details of pension calculations and the mechanisms and rules taken into account). Our representative cases may thus have anywhere between 0 and 3 children, without altering the results. As a result, the calculations are highly theoretical.

When we strip away the mortality differential between the sexes and the specific rules governing contribution rates for the different pension schemes (excluding partial relief on pension contributions, uncapped CNAV contributions and the CET-CEG scheme for

*4. Since 2024, the face value of a point has been indexed to estimated inflation for the year (−0.4 points). The purchase value of points is tied to the mean salary in the private sector for the preceding year. From 2027 to 2038, the face value will follow the mean salary with a 1.16% discount, while the purchase value will continue to mirror the mean salary. From 2038 onwards the face value and purchase value should both follow the mean salary with a 1.16% discount. Moreover, the solidarity coefficients (*malus*) will no longer apply. The contribution rate used here is the mean rate.*

5. CSG/CRDS, CASA and health insurance contribution of 1% on supplementary pensions. In accordance with point III of Article L136-8 of the Social Security Code, the threshold values used to calculate the rate of CSG vary in line with inflation.

Box – **Rules Governing the Acquisition and Calculation of Pension Rights, the Principal Implicit Mechanisms of Pension Calculations, and Explicit Measures Driving Redistribution Between Women and Men**

In the private sector pension schemes, an individual's total direct pension entitlement corresponds to the sum total of the basic state pension (calculated on an annuity basis) and their supplementary pension (calculated on a points basis). These calculations are detailed here at full rate (no discount or bonus).

The basis state pension is the product of three inputs: $SAM \times clearance\_rate \times prorata\_coef$.

The reference salary (*SAM*) is equivalent to the mean salary over the 25 top-earning years of an individual's career, based on gross wages and any virtual salaries added to their pension account to compensate for periods of unemployment (in this case AVPF). The value of these salaries is readjusted with reference to prices.

The clearance rate (*clearance_rate*) is 50% at full rate, attained if the individual has made national insurance contributions for the requisite period of time (172 quarters), has been declared unfit for work or disabled, or is aged 67 or over.

The pro rata coefficient (*prorata_coef*) is equal to the ratio between the duration of contributions to the general scheme (equal to the total period of pension payments (*DAT*) for beneficiaries with a single pension) and the length of time in employment required to qualify for a full pension (*DAR*), bounded to 1. A beneficiary's *DAT* is equal to the sum of all periods of contributions while in employment (one quarter = 150 hours of work at minimum wage) plus all eligible periods when they were not in work (unemployment, illness, AVPF). To this may also be added time bonuses for parental leave.

At full rate, the general scheme pension may be supplemented to reach the minimum level (MiCo), calculated pro rata to *DAT*. Finally, there is also a 10% pension bonus for parents of three or more children and, since the 2023 reform, a bonus if the beneficiary has received at least one quarter of time bonus (the maternity bonus).

The direct, full-rate AGIRC-ARRCO pension is equal to: $TOT\_PTS \times VS$

where *TOT_PTS* (total number of points accrued over the course of career) corresponds to the sum total of points accrued during periods of employment and any free points accrued during periods out of work (unemployment with benefits, illness etc.) and *VS* is the value of these points at the retirement date.

The number of points accumulated annually depends on the salary, the rate of contributions used to calculate point acquisition, and the purchase value of points. The rate of contribution, which is different for those pensioners below the social security cap and those in brackets 1 through 8, is supplemented with a call rate (127%) and the general balanced contribution (CEG), which is 2.15% beneath the social security cap and 2.70% for brackets 1 through 8, plus a technical balanced contribution (CET, only applicable to beneficiaries whose salaries exceed the cap) applied at a rate of 0.35% to both brackets.

Duration of national insurance contributions (number of quarters) is indirectly taken into account in the calculation of supplementary pensions. The full rate (i.e. full pension without discount) is acquired if a pensioner qualifies for the general scheme at full rate. The ratio of the value of points to their purchase price determines the immediate yield of the scheme.

There is no minimum pension. Finally, this pension may be supplemented by a 10% bonus for parents of three or more children.

Table A – **Summary of the implicit mechanisms and explicit measures studied**

	Basic scheme	Supplementary scheme
Acquisition of pension rights	Exemptions on contributions for low salaries	
	Uncapped contributions	CET and CEG
Implicit mechanisms	Pooling of mortality risk	
	"25 best years" rule for calculating mean annual salary	
Explicit measures	On duration of insurance contributions: credited periods for child-rearing and AVPF	
	On the value of pensions: AVPF, minimum pension, pension bonus for 3 or more children, pension bonus linked to credited periods for child-rearing	Pension bonus for women with 3 or more children

AGIRC-ARRCO), while also neutralising both implicit and explicit mechanisms, the representative cases for executives and for non-executive employees with career breaks and minimum wage have notably smaller RRC values than non-executive beneficiaries (see Figure II). However, logically enough, there does not appear to be any clear and direct redistribution from men to women, since the pension system is contributive.[6]

6. *IRRC results are presented in Appendix 2.*

In order to estimate how each rule modifies redistribution between women and men, I thus reintroduced the various mechanisms one-by-one in reverse order, first estimating the effects associated with contribution rules, then the effects of the mechanisms implicit to pension calculations (the core of the pension system), then the effects of solidarity measures. The estimation of each specific effect induced by these measures depends on the order in which they are reintroduced, on account of the non-linearity of pension calculations.

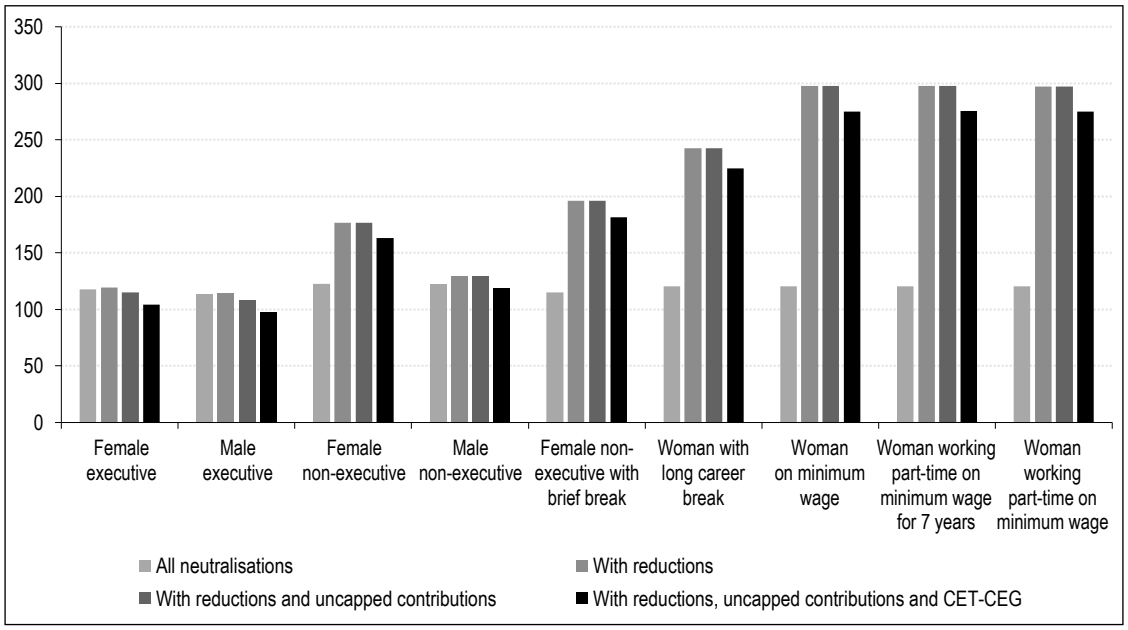
3.1. Effects Linked To Contribution Rules

Partial relief on pension contributions on contributions for those on low wages constitute an important contributing factor to disparities of return. Non-executive women – and, by construction, those working for minimum wage – earn salaries of below 1.6 x the legal minimum wage throughout their careers, and thus qualify for these exemptions: taking them into consideration greatly improves their return rate on contributions (from 54 points for female non-executives to 177 points for women on minimum wage). Male non-executives, whose wages are generally higher than female non-executives, only qualify for these exemptions for 24 years of their professional careers; their RRC is thus boosted by 7 points. Finally, these arrangements have virtually no impact on our executive representative cases (Figure II).

Another potential source of disparity is the portion of contributions which do not open up pension rights with the general scheme or AGIRC-ARRCCO. Uncapped contributions to the general scheme do not accrue pension rights. While the effect of this contribution is neutral with regard to redistribution between our representative cases situated below the social security cap, it tends to reduce the RRC for executives because a sizeable proportion of their salaries is above the social security cap (−4 points for women and −6 points for men). In the supplementary scheme, the proportion of contributions which do not open up pension rights is higher for the share beneath the social security cap (45%) than it is for that share above the cap (38%): taking these contributions into account thus has the effect of redistributing wealth from women to men, since it drives down the return rate on contributions for women, especially those working at minimum wage (−22 points), more so than for men (−10 points).

When we reintroduce exemptions on pension contributions for those on low wages, as well as contributions which do not open up pension rights, the rates of contributions levied on earnings vary greatly between our representative cases, and are much lower for lower salaries. This substantial reduction serves to increase the RRC for those representative cases with the lowest wages, thus making a positive contribution to redistribution between the genders (see

Figure II – **Net return rates on contributions for executive and non-executive women and men by career trajectory, incorporating reduced contributions, uncapped contributions and CET-CEG**



Note: These rates were calculated by updating the flows with reference to AWPC.
Reading note: Neutralising all pension calculation mechanisms (first bar), the RR for female executives is 117.6%.
Source: Author's calculations, hypotheses COR 2024.

Figure I). Taking these rules into consideration, the RRC for women ranges from 104% (for female executives) and 275% (for women on minimum wage), and in both cases is higher than the RRC for men, which varies from 98% (executives) to 119% (non-executives). These gaps are reflected in the IRR (see Appendix 2).

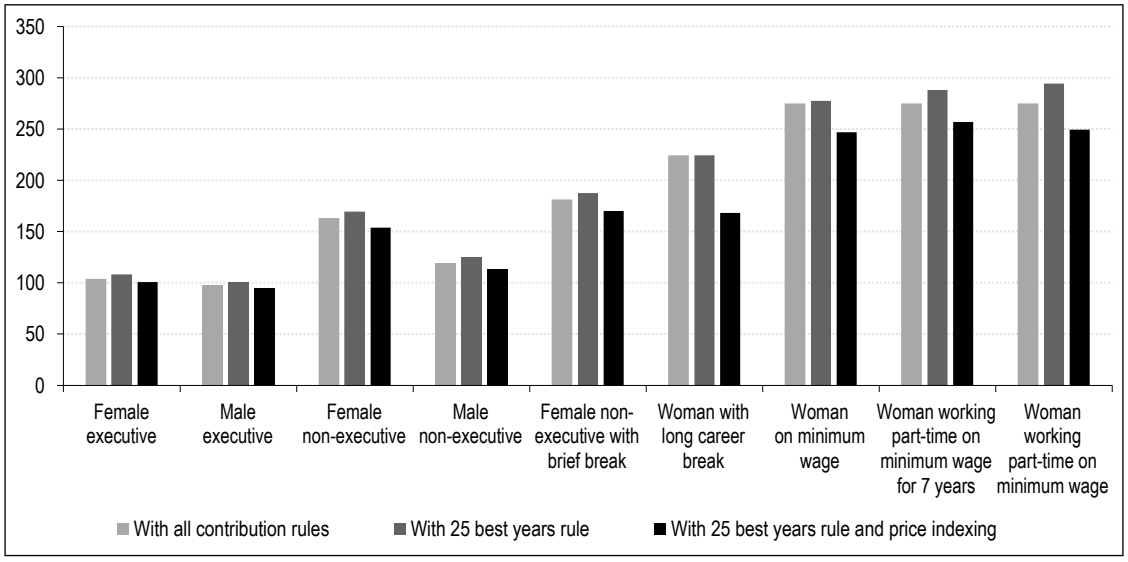
3.2. Mechanisms Implicit To the Calculation of Basic State Pensions Have Undetermined Redistributive Consequences

Thereafter, there are two principal mechanisms which alter redistribution between men and women via the level of benefits received from the basic state pension scheme. Their specific effects can be studied by successively reintroducing: 1) calculation of the basic pension using the 25 best years of a beneficiary's career; 2) price indexing to adjust the value of past salaries when calculating the value of pensions at retirement. In all cases, the contribution rules discussed above were taken into account.

The *25 best years* rule discounts the years where beneficiaries' wages were at their lowest (or non-existent) when calculating the worth of their pensions. Nevertheless, the effects of this rule are ambiguous (Aubert & Duc, 2011). While it does serve to neutralise the impact of spells of part-time work or short career breaks, it also proves to be beneficial to those with the most ascendant career trajectories, as long as they remain beneath the social security cap. Taking this rule into account, and indexing pension rights against wages, the return rate on contributions rises by 6 points for our non-executive representative cases with full careers and for women taking temporary career breaks, and by between 12 and 19 points for women working part-time for minimum wage. However, the rule has little impact on representative cases with linear careers, since calculating pension rights with reference to their 25 best years or their career as a whole yields very similar results. The gains are thus less substantial for women working full-time on minimum wage (+2 points) and for executives (between 3 and 4 points), whose wages as used in the annual average earnings calculations are limited by the social security cap, which effectively flattens them at this level (see Figure I). Finally, for those who have made pension contributions for fewer than 25 years, annual average earnings are calculated across the whole career: this rule therefore does not benefit those with the shortest careers, in our case our non-executive woman who stops working at the age of 30, whose annual average earnings will de facto always be calculated on the basis of her eight years in employment. The impact of this rule in terms of male-female redistribution thus depends on the proportion of the total population represented by each category (see Figure III).

Furthermore, when *pension rights are indexed to prices* rather than wages, the greater the gap between prices and salaries, the steeper the earned income curve will become with age, since salaries from earlier in beneficiaries' careers count for less. This measure thus

Figure III – **Net return rates on contributions for executive and non-executive women and men by career trajectory, incorporating all contribution rules, the "25 best years" rule and indexing of pensions to prices**



Note: These rates were calculated by updating the flows with reference to AWPC.
Reading note: Taking into account all of the implicit mechanisms of the pension system (black bar), the RR for female executives is 100.7%.
Source: Author's calculations, hypotheses COR 2024.

penalises those careers where earnings see the least dynamic increases. The benefit rate for non-executive women, particularly those who take career breaks, is reduced by 56 points, while the rates for women working for minimum wage, and working part-time, fall by 31 points and 44 points. This re-evaluation method thus has negative consequences for redistribution between men and women (Figure III).

3.3. What Are the Consequences of Differential Mortality?

In order to neutralise the differences in the mortality rate for men and women, the RRC were initially calculated using the *mean life expectancy for both genders combined*.[7] However, when retirement dates are identical, women have longer retirements on account of their greater life expectancy, even though the calculation of pension systems upon retirement does not take this into consideration, as the pension system is designed to pool mortality risk (Table 2).

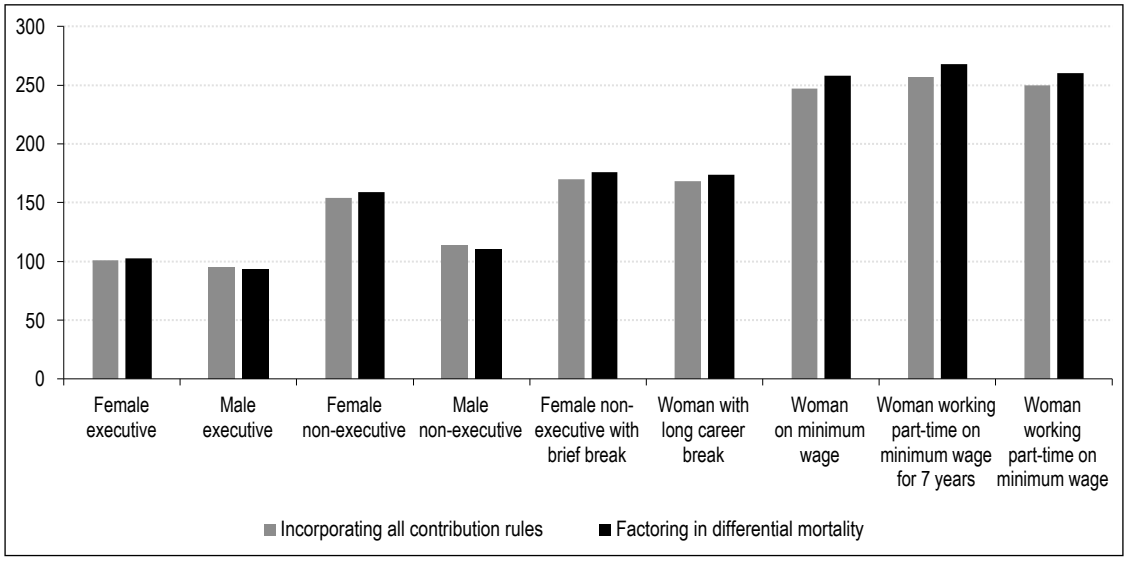
7. This method does not allow us to calculate the gain induced by the greater average life expectancy of women, all other factors being equal. In order to isolate this effect, it would be necessary to study men and women with precisely the same careers, which would permit us to neutralise all of the other effects (the only difference in rate of return would thus come from the mortality differential).

Table 2 – **Retirement age before solidarity measures, and post-retirement life expectancy for both sexes**

In years	Retirement age	Life expectancy at retirement, without differential mortality	Life expectancy at retirement, with differential mortality
Female executive	65.5	27.9	28.6
Male executive	65.2	28.1	27.9
Female non-executive	65.0	26.8	27.8
Male non-executive	65.0	26.8	25.8
Female non-executive with brief break	67.0	24.8	25.8
Woman with long career break	67.0	24.8	25.8
Woman on minimum wage	64.0	27.0	28.3
Woman working part-time on minimum wage for 7 years	64.0	27.0	28.3
Woman working part-time on minimum wage	64.0	27.0	28.3

Note: Even if they started their careers at exactly the same age, a male executive may be able to retire 3 months earlier than a female executive on account of completing more quarters in his first year of work, thanks to the 150 hours at minimum wage rule (see Box).
Source: Author's calculations, hypotheses COR 2024, based on INSEE 2021.

Figure IV – **Net return rates on contributions for women and men by career trajectory, incorporating all calculation rules, implicit mechanisms and differential mortality**



Note: These rates were calculated by updating the flows with reference to AWPC.
Reading note: Incorporating all implicit mechanisms of pension calculation, and factoring in differential mortality (black bar), the RR for female executives is 102.6%.
Source: Author's calculations, hypotheses COR 2024.

When we reintroduce the disparity in life expectancy between women and men, the improvement in RRC for women on minimum wage, part-time or not, is in the region of 10 points (Figure IV). For our non-executive cases, the return rate on contributions shrinks by just under 4 points for men, while for women it improves by 5 points. For executives, the RRC decreases by around 2 points for men, and increases by approximately the same amount for women.

3.4. The Effects of Solidarity Measures Associated With Children and the Minimum Pension

The core of the pension system, excluding solidarity measures, is thus ultimately redistributive from men towards women, primarily due to the greater life expectancy of the latter as well as the lower rates of contributions they pay. Nevertheless, it is important to consider the number of children people have and the impact of solidarity measures, particularly family benefits, which affect women and men differently.

As in the previous sections, in this section I study the specific effects of the principal measures by adding each of them to the calculations in turn: old-age insurance contributions for stay-at-home parents (AVPF), insurance duration bonuses, pension bonuses and, finally, the minimum pension. The results also depend not only on the order in which the measures are reintroduced, but also on whether or not subjects have children, and on the AVPF.

3.4.1. The Effects of Solidarity Measures Associated With Children

Specific rights were introduced for women with children in the wake of the Boulin Acts of 1971. Among other things, these measures were designed to compensate for career breaks for childcare purposes, at a time where female employment was low and women were paid much lower wages than men.

A parent reducing their working hours or taking a break from work altogether may receive, subject to means tested eligibility, family benefits which also entitle them to old-age insurance contributions for stay-at-home parents (French: *Assurance Vieillesse des Parents au Foyer,* or AVPF).[8] Legally speaking, these measures are not specifically aimed at women (the AVPF was introduced in 1972, and opened up to men in 1979), but in reality they remain largely female-oriented because in 2017, according to the IGAS, over 90% of beneficiaries on parental leave were women (Auzel *et al.*, 2019). The AVPF has an impact on two components of the pension calculations. Beneficiaries' pension accounts are topped up with supplementary salaries (equivalent to 169 hours worked at minimum wage), which serves to boost their mean annual salary, and complete the necessary number of quarterly contributions.[9] These quarters may allow beneficiaries to retire earlier and still take their full pension, but they may also increase the value of that monthly pension at retirement by increasing the pro rata calculation coefficient.[10] The AVPF thus ensures that beneficiaries who cut down their working hours or take career breaks to look after their children are not so harshly penalised when they reach retirement. The return rate on contributions thus increases by 2 points for our woman working part-time for minimum wage for a short period of time, and by 59 points for our woman who works part-time for virtually her entire career. The RRC increases more than fourfold for women who cut short their careers at a young age (Figure V).

The most well-known measure is the credited periods for child-rearing. In the private sector, four quarters of contributions are allocated for the birth of a child and four during the child's education, two of which are automatically allocated to the mother. The last two quarters can be shared between the mother and father before the child reaches the age of four, but by default they are allocated to the mother. These credited periods may allow women to unlock their full pension rights earlier (executive and non-executive women with full careers, and women who take career breaks and receive the AVPF benefit) and/or to increase the value of their basic pensions by attaining the time threshold required by the pro rata calculation coefficient. The impact is more pronounced for shorter careers, as this bonus is awarded on a per-child basis (Aubert & Bachelet, 2012): as such, benefiting from the full complement of bonus quarters can be useful. Contribution time bonuses have a de facto redistributive effect between the sexes, since the RRC increases when a woman retires earlier or receives a higher pension (an increase ranging from 6 points for female executives to 108 points for women with short careers receiving the AVPF). However, if a woman has already reached or exceeded the number of quarters required to retire on a full pension at the statutory retirement age, these additional quarters

8. The shared childcare benefit (PreParE), the basic childcare benefit (Paje), family benefits and the daily parental presence allowance (AJPP).
9. In return, the CNAV receives funding from the CNAF.
10. If the beneficiary earns more than minimum wage (for 169 hours) before the break, then receiving the AVPF may lead to a reduction in their reference salary if these years are included in the 25 best year calculations.

may be (at least partially) unnecessary (e.g. for the minimum wage case), and the RRC remains the same regardless of number of children.

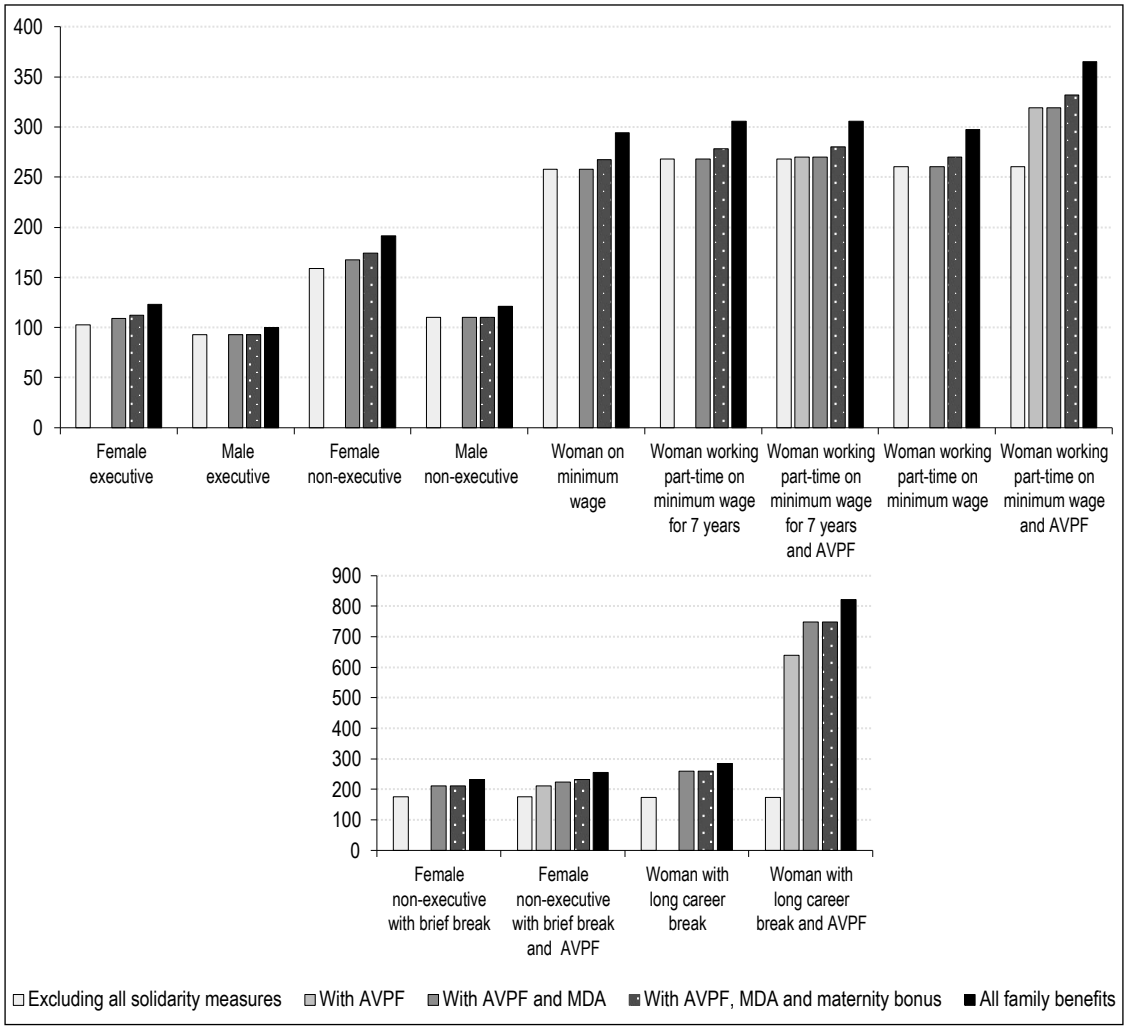
Moreover, since the 2023 reform mothers may also receive a pension bonus derived from credited periods for child-rearing (known as the maternity bonus). This bonus allows mothers eligible for the time bonus who have worked full careers and are still in work at the age of 63 to qualify for a 1.25% increase in the value of their monthly pension for each additional quarter of contributions, up to a maximum of 5% (on top of the existing bonus). While this measure does accentuate redistribution from men to women, it is worth noting that it is only beneficial to women with longer careers (Figure V), and thus with higher pensions.

The final parental measure is a 10% pension bonus, paid by both the basic state pension scheme and the AGIRC-ARRCCO supplementary scheme, to parents, both women and men, with three or more children. Because it is proportional in nature, this measure does not induce any redistribution between the sexes (Figure V).

3.4.2. Effects of the Minimum Pension

Finally, the basic state pension is levelled up to a minimum value calculated pro rata to the length of time for which contributions are paid (known in French as the *minimum contributif*, or MiCo), as long as the beneficiary has accrued their full pension rights, and subject to a cap, all schemes combined. The impact of the MiCo is twice as beneficial to women as it is to men (Chopard, 2024). It operates on an individual, contributive basis, and should not be confused with the ASPA benefit (the solidarity allowance for elderly citizens, formerly

Figure V – **Net return rates on contributions for women and men with three children, by career trajectory and incorporating solidarity measures for parents**



Note: These rates were calculated by updating the flows with reference to AWPC.
Lecture: Taking family benefits into account (black bar), the RR for female executives is 123%.
Source: Author's calculations, hypotheses COR 2024.

known as the *minimum vieillesse*), which is not dependent upon a beneficiary's contributions. A MiCo bonus for quarters on contributions (120 since 2009) has been in place since 2004. This measure tends to boost the RRC of women who spend their careers working for minimum wage (with or without part-time work) and women who stop working very young (Table 3). The MiCo thus serves to offset periods of part-time work while raising children, whereas no explicit measure has been put in place for this purpose in the private sector.

3.5. Disparities in the Rates of Return From Different Pension Schemes

Taking into account the mortality differential between the sexes, all of the rules governing the acquisition and calculation of pension rights, and the principal solidarity measures, the pension system does appear to achieve redistribution away from men towards women (see Table 4). Return rate on contributions for women without children range from 103% (for female executives) to 348% (for women working part-time for minimum wage after the age of 30.5), and in both cases are higher than the RRC for men, which range from 93% (executive) to 110% (non-executive). With three children, return rate on contributions are higher for women than they are for men. However, this gender disparity is accentuated by family pension rights. For full careers, the RRC for women with children is increased by 20 points for executives and by 50 points for women on

Table 3 – **Impact of the minimum pension (MiCo) on the net return rate on contributions for men and women, with reference to their career trajectory, number of children and presence/absence of AVPF**

Without children	Without MiCo	With MiCo	Contribution of MiCo
Female executive	102.6	102.6	-
Male executive	92.8	92.8	-
Female non-executive	158.9	158.9	-
Male non-executive	110.1	110.1	-
Female non-executive with brief break	175.8	175.8	-
Woman with long career break	173.9	201.3	27.4
Woman on minimum wage	257.8	282.0	24.1
Woman working part-time on minimum wage for 7 years	268.0	293.4	25.4
Woman working part-time on minimum wage	260.3	347.6	87.3

With three children and without AVPF	Without MiCo	With MiCo	Contribution of MiCo
Female executive	123.0	123.0	-
Male executive	100.0	100.0	-
Female non-executive	191.2	191.2	-
Male non-executive	121.1	121.1	-
Female non-executive with brief break	233.3	233.3	-
Woman with long career break	284.9	335.2	50.3
Woman on minimum wage	294.2	322.1	27.9
Woman working part-time on minimum wage for 7 years	305.9	335.2	29.3
Woman working part-time on minimum wage	297.1	398.0	100.9

With three children and AVPF	Without MiCo	With MiCo	Contribution of MiCo
Female executive	123.0	123.0	-
Male executive	100.0	100.0	-
Female non-executive	191.2	191.2	-
Male non-executive	121.1	121.1	-
Female non-executive with brief break	256.3	256.3	-
Woman with long career break	822.9	890.1	67.2
Woman on minimum wage	294.2	322.1	27.9
Woman working part-time on minimum wage for 7 years	307.8	335.2	27.4
Woman working part-time on minimum wage	364.9	398.0	33.0

Note: These rates were calculated by updating the flows with reference to AWPC.
Source: Author's calculations, hypotheses COR 2024.

Table 4 – **Net return rate on contributions for men and women, with reference to their career trajectory, number of children and presence/absence, in %**

	Overall	CNAV	AGIRC-ARRCO	Overall	CNAV	AGIRC-ARRCO
Female executive	102.6	132.7	79.6	123.0	164.2	91.3
Male executive	92.8	118.6	78.8	100.0	130.4	83.4
Female non-executive	158.9	191.5	103.2	191.2	234.0	118.1
Male non-executive	110.1	133.3	70.7	121.1	146.6	77.7
Female non-executive with brief break	175.8	210.7	116.0	233.3	288.6	138.5
Female non-executive with brief break and AVPF				256.3	321.8	144.0
Woman with long career break	173.9	201.8	125.9	822.9	1,220.4	138.5
Woman with long career break and AVPF				284.9	370.0	138.5
Woman on minimum wage	257.8	303.4	179.1	294.2	350.4	197.0
Woman working part-time on minimum wage for 7 years	268.0	318.9	179.9	307.8	371.4	197.9
Woman working part-time on minimum wage for 7 years and receiving AVPF				305.9	368.4	197.9
Woman working part-time on minimum wage	260.3	308.2	177.4	364.9	463.1	195.1
Woman working part-time on minimum wage, with AVPF				297.1	356.0	195.1

Note: These rates were calculated by updating the flows with reference to AWPC.
Source: Author's calculations, hypotheses COR 2024.

minimum wage, compared with women without children. The increase is 7 points for executive men and 11 points for non-executives. For non-executive women with incomplete careers, or women working part-time on minimum wage, the increase in the RRC is even more significant, but depends on whether or not they receive the AVPF benefit: the return rate on contributions for a woman with three children who stops working young but receives AVPF is thus more than quadrupled compared with a woman with the same career trajectory but no children.

Disparities in the RRC for women and for men can be observed both in the general scheme (basic state pension) and in the supplementary AGIRC-ARRCO scheme. However, the rates are much lower overall in the supplementary scheme, on account of the decline in the immediate yield (see Box) of this scheme over the past 30 years (which is forecast to continue in the coming years) and the lesser impact of solidarity measures. The biggest differences concern women with children (Table 4). These differences between the schemes can be partly attributed to disparities between the sexes and between different socio-professional categories: the higher the proportion of AGIRC-ARRCO in an individual's total pension, the lower the return rate on contributions will be. As men are disproportionately represented in the highest salary bracket (executives), disparities of yield arising from the structure of the pension system serve to accentuate redistribution between the sexes.

4. What Effect Has the 2023 Reform Had on Redistribution Between Men and Women?

The 2023 pension reform contains several measures which have consequences for pension returns and redistribution between the sexes. We neutralised these measures one after the other in order to determine their specific effects on gender redistribution.

First of all, the reform reiterates the government's objective to guarantee a full pension (basic plus supplementary) equivalent to 85% of the net minimum wage net, for all workers completing full careers at minimum wage.[11] To this end, the value of the MiCo has been raised by 100 Euros (calculated pro rata for the length of career contributions), for both current and future pensioners, and is indexed to minimum wage at time of retirement, instead of prices. The impact of this measure is visible for women on minimum wage and non-executive women who stop working early, particularly those with children (Table 4). This effect is precisely equal to that calculated above: with the MiCo now indexed to the minimum wage, these women now qualify for this measure, which was not the case when the MiCo was indexed to prices. This measure thus serves to accentuate redistribution between the genders.

11. Hitting this target will depend on the way supplementary pension evolve, given that they have no guaranteed minimum.

The reform also introduces a maternity bonus for women qualifying for credited periods for child-rearing. The effects of this bonus are visible for all women still in work at the age of 63 who have already met the necessary conditions in terms of the number of years worked.

The most emblematic measure contained in the reform was to push back the retirement age by two years, modifying the duration of retirement for beneficiaries retiring before the age of 64. Of those profiles without children, only our representative cases working for minimum wage, who could previously retire at the age of 63, are affected. Their RRC has fallen by around 13 points (Table 5). For women with children the decrease is even more substantial. This is true for women in both executive and non-executive

Table 5 – **Specific effects of the various measures contained in the 2023 pensions reform on the net return rates on contributions, in %**

Without children	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	103.0	-	-	-	−0.4	−0.4	102.6
Male executive	93.1	-	-	-	−0.3	−0.3	92.8
Female non-executive	159.4	-	-	-	−0.5	−0.5	158.9
Male non-executive	110.7	-	-	-	−0.5	−0.5	110.1
Female non-executive with brief break	176.5	-	-	-	−0.7	−0.7	175.8
Woman with long career break	174.3	27.4	-	-	−0.4	27.1	201.3
Woman on minimum wage	269.8	24.1	-	−12.7	0.8	12.2	282.0
Woman working part-time on minimum wage for 7 years	280.7	25.4	-	−13.5	0.8	12.7	293.4
Woman working part-time on minimum wage	273.2	87.3	-	−13.3	0.4	74.4	347.6

With three children and without AVPF	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	131.6	-	3.4	−11.6	−0.4	−8.6	123.0
Male executive	100.3	-	-	-	−0.3	−0.3	100.0
Female non-executive	204.7	-	7.0	−20.0	−0.5	−13.4	191.2
Male non-executive	121.7	-	-	-	−0.6	−0.6	121.1
Female non-executive with brief break	233.8	-	-	-	−0.5	−0.5	233.3
Woman with long career break	285.5	50.3	-	-	−0.6	49.7	335.2
Woman on minimum wage	311.3	27.9	10.6	−28.5	0.9	10.8	322.1
Woman working part-time on minimum wage for 7 years	324.3	29.3	11.1	−30.3	0.9	11.0	335.2
Woman working part-time on minimum wage	315.7	100.9	10.7	−29.8	0.4	82.2	398.0

With three children and AVPF	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	131.6	-	3.4	−11.6	−0.4	−8.6	123.0
Male executive	100.3	-	-	-	−0.3	−0.3	100.0
Female non-executive	204.7	-	7.0	−20.0	−0.5	−13.4	191.2
Male non-executive	121.7	-	-	-	−0.6	−0.6	121.1
Female non-executive with brief break	275.8	-	9.7	−28.8	−0.4	−19.5	256.3
Woman with long career break	824.6	67.2	-	-	−1.7	65.5	890.1
Woman on minimum wage	311.3	27.9	10.6	−28.5	0.9	10.8	322.1
Woman working part-time on minimum wage for 7 years	327.2	27.4	11.2	−31.4	0.9	8.1	335.2
Woman working part-time on minimum wage	391.0	33.0	14.0	−40.4	0.4	7.0	398.0

Note: These rates were calculated by updating the flows with reference to AWPC; RA stands for retirement age, the age at which individuals are eligible to claim their pension.
Source: Author's calculations, hypotheses COR 2024.

roles. Time bonuses for women with children previously allowed them to retire immediately at the minimum retirement age; these women must now delay their retirement until they reach the age of 64. As per the results of the DREES study presented in the Annual Report of the Pensions Advisory Council for 2023, this measure appears to lead to redistribution from women towards men.

Finally, other measures such as the abolition of AGIRC-ARRCCO solidarity coefficients (temporary penalty of 10% on the supplementary pension for three years, or until the age of 67), and the raising of the uncapped contribution rates for the CNAV, have relatively limited and neutral consequences for redistribution between the sexes.

Overall, the 2023 reform appears to have increased redistribution toward women on low incomes, primarily as a result of the increase and indexing of the MiCo minimum pension. However, it has reduced redistribution in favour of women on higher salaries working full careers. These results corroborate the findings of the 2023 DREES study.

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The French pension system induces substantial redistribution between men and women, benefiting the latter – in the sense that they receive a greater return on their pension contributions. This redistribution is driven by five types of mechanisms. First and foremost, the social and fiscal framework, and particularly partial relief on pension contributions on employer contributions for those on the lowest wages, more likely to be women, has a substantial implicit redistributive effect in favour of women. A similar effect can be attributed to mechanisms specific to individuals, especially the differential in life expectancy between women and men, although this is expected to decrease in the future.[12] Elsewhere, the rules specific to the basic state pension have a relatively ambiguous effect on redistribution. However, the fact that the RRC for AGIRC-ARRCO is lower than the RRC for CNAV, and that the importance of supplementary pensions as a proportion of total pensions increases in line with wages, serves to accentuate redistribution between men and women. Finally, solidarity mechanisms – especially those which, by design or de facto, benefit women – allow for explicit and substantial redistribution from men to women, especially women who do not work full careers.

This study focuses exclusively on own pensions. Survivor's pensions were not taken into consideration, even though they induce significant redistribution from men towards married women, since the transferral of spousal pension rights is not conditional upon the beneficiary's personal contributions. While measuring the redistributive impact of this measure is not necessarily difficult, it is more pertinent with regard to distinctions between categories of households, rather than between men and women.

Last but not least, this study was conducted using representative cases. The advantage of this approach is that it allows for detailed study of the individual mechanisms which influence the gender redistribution induced by the pension system between the sexes. It does not, however, allow us to study the diversity of individual situations, nor the contribution of these redistributive movements to reducing pension inequality between women and men. A microsimulation approach might profitably complement these results. □

12. *See the INSEE demographic forecasts (December 2021).*

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APPENDIX 1

INTERNAL RATE OF RETURN AND RETURN RATE ON CONTRIBUTIONS: FORMALISATION AND EXAMPLE CALCULATIONS

The rate of return (*RR*) compares the total value of pension payments received (P_i) across the whole duration of an individual's retirement (dr) with the sum total of the pension contributions (C_i) they paid during their working life (duration: *dc*). Using α as the adjustment rate, it can be expressed as follows:

$$RR = \frac{\sum_{i=dc+1}^{dc+dr} P_i \left(1+\alpha\right)^i}{\sum_{i=1}^{dc} C_i \left(1+\alpha\right)^i}$$

The internal rate of return (*IRR*), meanwhile, is the rate which matches the flow of pensions received to the flow of contributions paid, so that:

$$-\sum_{i=1}^{dc} \frac{C_i}{\left(1+IRR\right)^i} + \sum_{i=dc+1}^{dc+dr} \frac{P_i}{\left(1+IRR\right)^i} = 0$$

if $\alpha = IRR$, then *RR* is equal to 100% (Vernière, 1998).

Example:

Take the example of an individual paying contributions over three periods of time: 100, then 102, then 104. This individual draws a pension for two periods of time: 162.3 then 167.2.

For this individual, the *IRR* is 3% (0.03) because:

$- 100 \times (1 + 0.03)^4 - 102 \times (1 + 0.03)^3 - 104 \times (1 + 0.03)^2 + 162.3 \times (1 + 0.03) + 167.2 = 0.$

Adjusting these values by *IRR* (3%), the *RR* is 100% because:

The sum of these adjusted contributions is equal to:

$100 \times (1 + 0.03)^4 + 102 \times (1 + 0.03)^3 + 104 \times (1 + 0.03)^2 = 334.34.$

The sum of the adjusted pension rights is equal to:

$162.3 \times (1 + 0.03) + 167.2 = 334.34.$

APPENDIX 2

RESULTS FOR INTERNAL RATES OF RETURN

Table A2 – **Specific effects of the various measures contained in the 2023 pensions reform on the net internal rates of return**

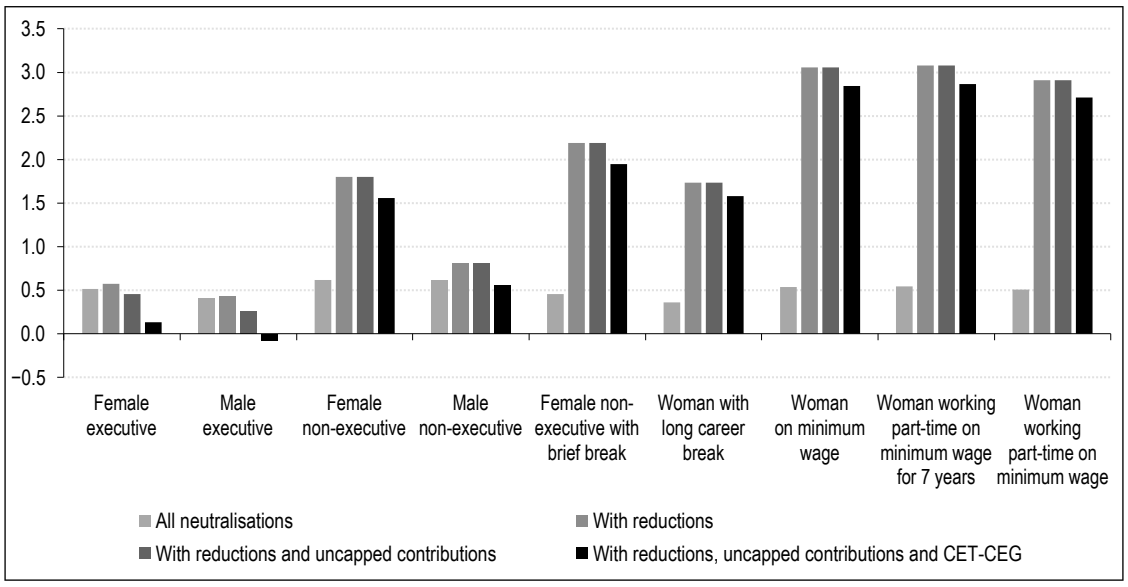
Without Children	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	0.1	-	-	-	0.0	0.0	0.1
Male executive	−0.2	-	-	-	0.0	0.0	−0.2
Female non-executive	1.5	-	-	-	0.0	0.0	1.4
Male non-executive	0.3	-	-	-	0.0	0.0	0.3
Female non-executive with brief break	1.8	-	-	-	0.0	0.0	1.8
Woman with long career break	1.1	0.3	-	-	0.0	0.3	1.4
Woman on minimum wage	2.8	0.2	-	−0.1	0.0	0.1	2.9
Woman working part-time on minimum wage for 7 years	2.9	0.2	-	−0.1	0.0	0.1	3.0
Woman working part-time on minimum wage	2.7	0.7	-	−0.1	0.0	0.6	3.3

With three children and without AVPF	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	0.9	-	0.1	−0.3	0.0	−0.2	0.7
Male executive	0.0	-	-	-	0.0	0.0	0.0
Female non-executive	2.3	-	0.1	−0.3	0.0	−0.2	2.0
Male non-executive	0.6	-	-	-	0.0	0.0	0.6
Female non-executive with brief break	2.7	-	-	-	0.0	0.0	2.7
Woman with long career break	2.0	0.3	-	-	0.0	0.3	2.4
Woman on minimum wage	3.2	0.2	0.1	−0.3	0.0	0.1	3.2
Woman working part-time on minimum wage for 7 years	3.3	0.2	0.1	−0.3	0.0	0.1	3.4
Woman working part-time on minimum wage	3.1	0.7	0.1	−0.3	0.0	0.6	3.6

With three children and AVPF	Pre-reform	MiCo	Bonus	RA	Other measures	Total effect of the reform	Post-reform
Female executive	0.9	-	0.1	−0.3	0.0	−0.2	0.7
Male executive	0.0	-	-	-	0.0	0.0	0.0
Female non-executive	2.3	-	0.1	−0.3	0.0	−0.2	2.0
Male non-executive	0.6	-	-	-	0.0	0.0	0.6
Female non-executive with brief break	2.7	-	-	-	0.0	0.0	2.7
Woman with long career break	2.0	0.3	-	-	0.0	0.3	2.4
Woman on minimum wage	3.2	0.2	0.1	−0.3	0.0	0.1	3.2
Woman working part-time on minimum wage for 7 years	3.3	0.2	0.1	−0.3	0.0	0.1	3.4
Woman working part-time on minimum wage	3.1	0.7	0.1	−0.3	0.0	0.6	3.6

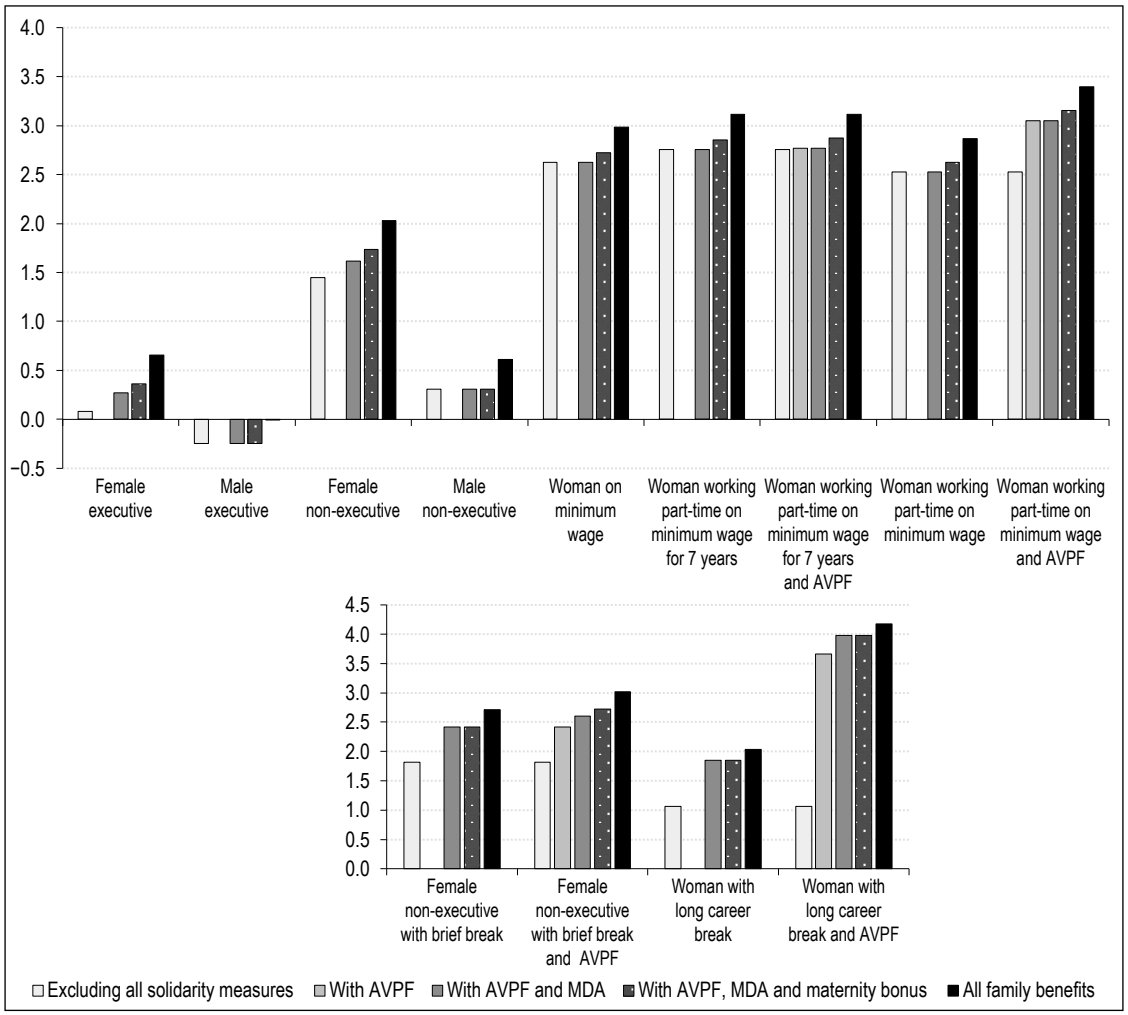
Note: These rates were calculated by updating the flows with reference to AWPC; RA stands for retirement age, the age at which individuals are eligible to claim their pension.
Source: Author's calculations, hypotheses COR 2024.

Figure A2-I – **Net internal rates of return for executive and non-executive women and men by career trajectory, with reduced contributions, uncapped contributions and CET-CEG, in %**



Note: These rates were calculated by updating the flows with reference to AWPC.
Source: Author's calculations, hypotheses COR 2024.

Figure A2-II – **Net internal rates of return for women and men with three children, by career trajectory and incorporating solidarity measures for parents**



Note: These rates were calculated by updating the flows with reference to AWPC.
Source: Author's calculations, hypotheses COR 2024.