How are women catching up?
A slow decline of the gender pension gap between generations [1]

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Abstract

Women's pensions are roughly half those of men on average in Western countries, and France is no exception. Female lower wages and career interruptions are the main reasons for this stylized fact. It is often argued that the gender pension gap will spontaneously narrow as the proportion of new female retirees with a complete career increases. In this paper we decompose the gender pension gap in 2008 and 2012 according to their main components: career duration, past wages and public policy. Then we analyze the factors explaining the changes between 2008 and 2012. To do so, we compare cohorts at the same age in 2008 and 2012 and we estimate the influence of each component on the variation of the gender pension gap. For retirees as a whole, career duration and reference wage are the most important explanatory factors in 2008 as well as in 2012, but the contribution of career duration to the pension gap decreases in 2012. Decomposition of the changes between 2008 and 2012 by age group confirms that the gender pension gap is narrowing slightly for each group. This is due to improved characteristics for women which more than outweigh the improvements for men, particularly in the private sector.

Keywords: Pension, Decomposition, Gender gap, Private and Public sector, Generations.

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1. Introduction

Women's pensions are roughly half those of men on average (Bettio et al., 2015, for a comparative study). France is no exception: on average, across all own pensions (public and private), women's pensions are only 60% of those of men (Bonnet and Hourriez, 2012). Female lower wages and more fragmented career trajectories are the main explanations for this stylized fact (Bettio et al., 2015).

Gender inequalities in retirement pensions have recently emerged as a serious issue for researchers (Ginn, 2001, Stahlberg et al., 2006, Jefferson, 2009, Vara, 2013, Ponthieux and Meurs, 2015) and have entered political debate (OECD, 2012, Bettio et al., 2015). Demographic and social changes are partly responsible for this rising interest. Traditional family with a stable couple where the husband is the breadwinner and the wife in charge of the household is no longer the social norm. New female retirees are more often divorced, single and their standard of living depends more on their own resources (Bonnet and Hourriez, 2012).

The size of the gender pension gap depends not only on the past careers of men and women, but also on the way pension rules transform accrued rights into pensions, in other words the relation between life cycle wages, career duration and pension level. This relation is determined both by the calculation formula, i.e., the way wages earned and periods of pensionable employment are taken into account, and by specific policies that aim to provide decent pensions (minimum pensions) or to take into account past family costs (bonus for children) and current family situation (survivor pensions).

It is often argued that the gender pension gap will spontaneously narrow and ultimately disappear as the proportions of new female retirees with a complete career increases. Indeed, the female to male pension ratio is increasing over generations. In France, it was 55% for the cohort born in 1934; it is 62% for the cohort born in 1942 (Aubert, 2012). However, progress in gender equality at work has been slowing down in recent decades. Moreover, most of the recent reforms in France have increased the contributive features of the pension system, resulting in a stronger correlation between pension amount and career characteristics. This puts women at a disadvantage, as they are more exposed to precarious

and low-paid jobs than men. Generally speaking, no sharp decline in the gender pension gap is expected in the short or medium term (Bettio et alii, 2013; Ponthieux and Meurs, 2015).

Surprisingly, there are very few quantitative studies on the components of the gender pension gap, and, to the best of our knowledge, none on their changes over time. Yet identifying the determinants of inequality matters a great deal for public policy. It is important to understand which factors contribute most to pension inequalities between men and women. One notable exception to the scarce literature on his topic is the article by Bardasi and Jenkins (2010), who analyze the mean difference between the private pension income of men and women in the UK in terms of personal pension coverage rates and personal characteristics. They show that the latter only explain half of the differential. Differences in the returns on personal characteristics for private pensions are the result of differences in the jobs taken and the number of hours worked. In other words, women are penalized in their access to "good" jobs, and this has an impact on their pension coverage and accrued rights. These results differ from those of Even and Macpherson (1994), who, using similar methods for the United States, find that the gender gap in private pensions is mainly linked to personal characteristics. Bardasi and Jenkins explain that this is primarily due to differences in the information used: in the American case, wage trajectories were available, so that the differences in returns on personal characteristics observed in the British case correspond in part to differences in income in the case of the United States.

This debate highlights the importance of data quality in identifying precisely the origin of differentials. We use a very rich administrative database for 2008 and 2012 covering all retirees[2] and allowing us to trace their working careers and wages earned, to distinguish between those who worked in the public and the private sectors, and to know their personal characteristics (current age, retirement age, origin) and family details (number of children), which influence the level of their pensions. The great advantage of an administrative data set is that we are able to apply the formula used to calculate pensions and hence to identify clearly the components of each individual level of pension.

[2] In the case of France, private pensions are still relatively uncommon and most pension income comes from public pension schemes. All employees are covered by such pension schemes, so there is no question of any selection effect in joining one.

We start by assessing the relative impact of work participation, level of wages and specific policies (minimum pension) on the gender gap in pensions. For this, we perform a standard decomposition of mean pensions as proposed by Oaxaca (1973) and Blinder (1973). Then we analyze the factors explaining changes in the gender pension gap between 2008 and 2012. Having two similar dataset enables us to disentangle cohort effects from age effects: first, pension legislation has changed over time; second, due to gender differences in mortality, the composition by sex and age is changing. So we choose to compare cohorts at the same age (66, 68, 70, 72 and 74 years) in 2008 and 2012 and we estimate the influence of each factor used to determine the pension on the variation in the gender pension gap.

The main results are as follows: for retirees as a whole, career duration and wages are by far the most important explanatory factors in 2008 as well as in 2012 (more than 80% of the mean difference can be ascribed to these two elements) but the contribution of duration to the gender pension gap is lower in 2012. The decomposition of the changes between 2008 and 2012 confirms that the gender pension gap is narrowing slightly or each age group, especially at the age of 72 (people born in 1938 and 1942, respectively). This is mainly due to improved characteristics for women (wage, duration) which more than outweigh the improvements for men. Moreover, we observe that minimum pension policies have a limited impact on these trends.

The following section presents the data set and some descriptive statistics. We then describe the methodology used in section 3. The fourth section comments on the results. Finally, the article ends with some concluding remarks .

2. **Data and descriptive statistics**

2.1. The data sets

We use a very rich and unique administrative French database, the inter-scheme sample of retirees or Echantillon Interrégimes de Retraités (EIR in French) that includes data on pensions and all information used to compute benefits: contribution periods, pension rates, employment status at retirement, increases or reductions in pension rates due to early or delayed retirement, etc. It covers both private (including schemes for self-employed people) and public sectors. This administrative database collects information directly from

retirement schemes and then matches the information by retiree. It includes all individuals in the sample who are receiving a retirement pension, either through direct entitlement or through indirect entitlement to a deceased spouse's pension, i.e. a survivor's pension. Virtually all obligatory retirement schemes, excepting some small ones, participate in the EIR. The 2008 (resp. 2012) wave of the EIR was designed to represent the population aged 35 and over as of December 31, 2008 (resp. 2012). The 2008 EIR includes 233,165 individuals who are receiving at least an own pension, and, possibly, a survivor's pension; the 2012 EIR 306,460 individuals.

We chose to concentrate on schemes for private sector employees and public employees. We thus deal with three groups of retirees:

- private sector employees, who are covered by the General Scheme (RG)
- public employees working for the central government, who are covered by the Service des Retraites de l'État (SRE)
- public employees working for local authorities or hospitals, who are covered by a separate scheme (CNRACL).

All told, they make up more than 80% of male and 90% of female retirees in 2008 and 2012.

Individuals may receive retirement pensions from more than one scheme if they worked in more than one sector over the course of their careers (for example, someone who started as a private sector employee and then became a public servant, or someone who worked in more than one type of employment at the same time). These retirees may be getting pensions from a single scheme (single-sector retirees) or from more than one (multi-sector retirees). In the rest of this article, we present our results for the different sectors, first for single-sector retirees, then for the whole sample (single and multi-sector retirees).

2.2. Descriptive statistics

The gender gap in pensions may stem from several factors involved in the calculation of pensions:

- the variables that directly link the past wage-earning career to the size of the pension, namely the length of contribution and the reference wage.

- the variables that measure the effects of public policies that aim to raise the pension level of specific groups of retirees. Here there will be dummy variables for the presence of three or more children, since this gives a bonus, and having retired for disability reasons.
- a dummy variable indicating whether the retiree receives a minimum pension.
- the retirement age. This plays a role because it is the result of a trade-off between earlier retirement and larger pension. It differs considerably between men and women, especially in the private sector.
- the year of birth, in order to take into account the composition of the stock. As the legislation has changed over time, and different cohorts may be subject to different rules, the link between length of contribution, wages, etc. and the level of pension depends on one's year of birth. Moreover, because of differential mortality, the survivors of the oldest generations are often the people with the highest pensions, especially for men.
- a dummy variable on whether the retiree was born in France, not because this affects the pension, but because these people have particular careers and this indicator enables us to reduce the measurement error.

The two variables that have the largest effect on the level of pensions are the length of contributions and the reference wage. The following graphs present the distributions of the lengths of contribution used in the calculation of pension levels (figures 1a and 1b), and then the distributions of reference wages (figures 2a and 2b), separately for men and women, for all retirees and then for each groups of retirees, in 2008 and 2012.

For retirees as a whole, we find, as expected, that the distribution of lengths of contribution is more concentrated for men, with a strong peak around 160 quarters (corresponding to a full-rate benefit for the largest share of the sample), while the distribution for women is more scattered, with many female retirees having lengths of contribution below 50 quarters. We notice a slight increase in the longest durations of contributions for women in 2012 compared to 2008. This general configuration is similar to that of the General Scheme, while the curves are of a very different shape for central government employees (single- or multi-sector), where the lengths of contribution differ

little between men and women[3]. The profiles for local government employees display an over-representation of short durations (less than 100 quarters) that is very pronounced for women, but also for single-sector men.

Turning our attention to the reference wage (figure 2a and 2b), the wage distribution of women in the General Scheme is clearly shifted to the left compared to men, indicating that the disadvantage in terms of contribution period is compounded by the disadvantage in wages. The general shapes are similar in 2008 and 2012, except for a slight increase in the number of the highest female wages (more than 2000 euros a month).

For central government retirees, the wage distributions of men and women are more similar, both in 2008 and in 2012. They are also more irregular, and the disadvantage in terms of the reference wage for women is not so clear, especially for the single-sector retirees. For single-sector retirees under the CNRACL scheme, the configurations are even more singular, with two peaks, one at 1600 euros and the other at 2500 euros, and a higher proportion of women in the lowest wage levels. The picture is not the same for multi-sector retirees under the CNRACL scheme, however, where the configurations are similar to those observed for the General Scheme, with an accumulation of low wages, although at higher levels as one moves up. The numerous peaks observed in the three forms of public sector employment, especially among single-sector retirees, is certainly due to the existence of pay scales that ensure that employees of the same category/group reach the same wage at the end of their careers.

3. **Methodology**

3.1. Decomposition of the mean gender pension gap (Oaxaca-Blinder)

[3] Short lengths of service (less than 15 years) in the public sector are subject to the "*clause de stage*" and switched back to the General Scheme, which automatically raises the average length of service in the public sector. However, this only involves a small number of workers.

To decompose the mean gender pension gap, we start with the classic method of Oaxaca (1973) and Blinder (1973). Formally, in the case of wage differences, this standard decomposition is written:

$$\bar{W}_m - \bar{W}_f = (\bar{X'}_m - \bar{X'}_f)\beta^* + \bar{X'}_m(\beta_m - \beta^*) + \bar{X'}_f(\beta^* - \beta_f)$$

where W_m (resp. W_f) represents the estimated mean wage of men (resp. women), $\overline{X}$ the observed individual characteristics and β^* the norm used to value those characteristics. Ideally, β^* represents the return to these characteristics in a non-discriminatory labor market (Oaxaca and Ransom, 1994).

Statistically, the same calculation can be used for the gender pension gap (as Bardasi and Jenkins (2010) did for Great Britain),[4] but the interpretation will be different. This is because the formulas used to calculate pensions are gender-neutral and unaffected by the current preferences of individuals. Some of the values used to calculate an individual's pension may be the result of personal choices (retirement age, for example), but once these values are known, the calculation is totally deterministic. So, whereas an employer might seek systematically to promote men rather than women, a scheme cannot refuse to give a monetary advantage to a woman if she is entitled to it. Likewise, the individual behavior of retirees cannot affect the level of pension received, conditionally to the variable used to compute the benefit. A man and a woman with exactly the same characteristics will get the same pensions, the returns to characteristics being identical by nature.

Consequently, the share of the pension gap explained by composition effects should in theory reach 100% if we can take into account all the constituent elements of pensions. The interest does not lie in the share explained – we will endeavor to reach 100% -, but in its composition. Thus, we seek to determine which elements – linked to past career and which can include past discrimination against women – are the most important in explaining the gender pension gap.

[4] Note that we decompose the log pension gap, as is usually done for wages, insofar as pensions are a multiplicative function of the measures considered (durations, wages), whereas the decomposition is an additive method.

In practice, however, there remains an "unexplained" part in the decomposition of the mean pension gap. Where does this unexplained part comes from?

First of all, it stems from the way the decomposition is performed. The formulas for the calculation of pensions are strongly non-linear, because of the existence of the contributory/guaranteed minimum, the way the payment rate is calculated for the General Scheme, and various ceilings. Consequently, the average returns to characteristics may potentially differ if their distributions between two groups differ, when the non-linearities affect each group differently. Furthermore, the variables we use to explain the pension level are indeed variables that determine the pension, but the link between the two may not be direct. Thus, in the private sector, we use the length of contributions to all schemes to measure the duration of activity. However, some quarters are "more useful" than others in the sense that they generate higher entitlements. For example, part of the length of contributions for women is actually a supplement added for each child, and it has no effect on either the yearly average wage nor on the rights accrued in complementary schemes. For this reason, a quarter may be more rewarding for men than women because it is more often associated with employment.

To limit the effects of non-linearities, the continuous variables are finely discretized before being introduced into the empirical analysis in the form of series of dummy variables. A dummy variable is created for each band of 5 quarters (for the duration), for each band of 100€ (for the reference wage), for each year of birth and for each quarter for the retirement date.[5] This allows, for example, each band of duration to have a different effect on the pension and does not require the transition from 50 to 55 quarters to have the same (marginal) effect on the pension as the transition from 150 to 155 quarters. In the results presented below, the effect of one factor, for example duration, is calculated by grouping together the contributions of all the dummy variables describing that factor.

Measurement errors may also play a role in the unexplained part. The reference wage that we determine for the calculation of an individual's pension is an approximation of

[5] In certain cases, some bands have been grouped together. For example, there are no retirees with a duration of less than 60 quarters receiving an SRE pension, because one must complete 15 years of service to be eligible for this pension (in practice, very few have less than 100 quarters). This does not prevent us from comparing the different types of pensioners.

the life cycle wage. The more linear the career, the more realistic it is, and the more fragmented the career (which is more often the case for women), the less realistic. Two people with the same reference wage can therefore have different pensions in the complementary schemes. The risk of measurement error in the reference wage is greatest for multi-sector retirees who have spent a large part of their career in a scheme other than those included in our analysis, because we do not model the wage reference for these schemes. This measurement error on wages will affect men more than women, because they are more likely to be multi-sector retirees.

3.2. Decomposition of the mean variation between two cohorts

The next step in our research is to decompose the variation of the gender pension gap between 2008 and 2012 for the same age group. The objective is to identify the main past components which have contributed to the (slow) decline of this gap.

There are various possible methods to decompose the variation of a given gap between two years. Here we choose to observe two cohorts at the same age ($t = 0, t = 1$). The subscript t are resp. the EIR 2008 and 2012. We want decompose the variation of the gender mean pension gaps (Δ) for these two cohorts

$$\Delta = (\bar{W}_M^1 - \bar{W}_F^1) - (\bar{W}_M^0 - \bar{W}_F^0)$$

Given $$(\bar{W}_M^t - \bar{W}_F^t) = (\bar{X}_M^t - \bar{X}_F^t)\beta^t + \delta^t = \Delta_X^t \beta^t + \delta^t$$

β^t is the vector of the return of characteristics X estimated on the pooled sample (men + women) of the retirees in the cohort t

Δ_X^t is the vector of the gender difference of the mean characteristics at the date t

The first term $((\bar{X}_M^t - \bar{X}_F^t)\beta^t)$ is the composition effect and δ^t is a parameter of the dummy sex in this regression, or the structure effect.

So

$$\Delta = (\bar{W}_M^1 - \bar{W}_F^1) - (\bar{W}_M^0 - \bar{W}_F^0) = (\Delta_X^1 \beta^1 + \delta^1) - (\Delta_X^0 \beta^0 + \delta^0)$$

$$\Delta = (\Delta_X^1 - \Delta_X^0)\beta^0 + \Delta_X^1(\beta^1 - \beta^0) + (\delta^1 - \delta^0)$$

Which is equivalent to :

$$\Delta_{\mathrm{X}}^{1} - \Delta_{\mathrm{X}}^{0} = (\overline{\mathrm{X}}_{\mathrm{M}}^{1} - \overline{\mathrm{X}}_{\mathrm{F}}^{1}) - (\overline{\mathrm{X}}_{\mathrm{M}}^{0} - \overline{\mathrm{X}}_{\mathrm{F}}^{0}) = (\overline{\mathrm{X}}_{\mathrm{M}}^{1} - \overline{\mathrm{X}}_{\mathrm{M}}^{0}) - (\overline{\mathrm{X}}_{\mathrm{F}}^{1} - \overline{\mathrm{X}}_{\mathrm{F}}^{0}) = \Delta_{\mathrm{X,M}} - \Delta_{\mathrm{X,F}}$$

So

$$\Delta = \left(\Delta_{X,M} - \Delta_{X,F}\right)\beta^{0} + \Delta_{X}^{1}(\beta^{1} - \beta^{0}) + (\delta^{1} - \delta^{0})$$

$$\Delta = \Delta_{X,M}\beta^{0} - \Delta_{X,F}\beta^{0} + \Delta_{X}^{1}(\beta^{1} - \beta^{0}) + (\delta^{1} - \delta^{0})$$

The mean variation is thus composed of 4 terms:

$\Delta_{\mathrm{X,M}}\beta^{0}$ is the variation of the male characteristics X between two cohorts ($\Delta_{\mathrm{X,M}}$) valued to the initial parameters. A positive sign indicates that the average male characteristics have been improved, which increases the gender gap (all the parameters are positive as all variables have a positive impact on the benefit).

$\Delta_{\mathrm{X,F}}\beta^{0}$ is the variation of the female characteristics X between two cohorts ($\Delta_{\mathrm{X,M}}$) valued to the initial parameters. A positive sign indicates that the average female characteristics have been improved, which decreases the gender gap.

$\Delta_{\mathrm{X}}^{1}(\beta^{1} - \beta^{0})$ is the variation of the parameters, valued by the gender difference of characteristics X for the second cohort (Δ_{X}^{1}). If the parameters changed little or not at all, this term is close to 0. Otherwise, as men have better characteristics than women (the duration and the reference wage), an increase in the parameters is equivalent to an increase in the return of these characteristics and is in favor of men. This part mainly measures the impact of the variation in the calculation formulas.

$\delta^{1} - \delta^{0}$ is the variation of the gender effect. All other things remaining equal, women have smaller pensions because a part of their quarters are not associated with employment (for instance supplement of quarters added for each child). The term measures the variations of this effect. It is expected to be negligible.

4. Results

4.1. Decomposition at the mean

Table 1 presents the results for all retirees and for each group of pensioners, taking into account all the variables that affect pensions including a dummy for the fact of receiving a minimum pension. The fits are of very good quality. The R^2 of the regressions used to

calculate the decomposition are high: between 67% and 95%. They are lowest for men in the General Scheme and very high for single-sector retirees (both men and women) from central government employment. This quality is due both to the fact that we incorporate the main determinants of retirement pensions and to the very flexible form used, which ensures taht non-linearities are taken into account very accurately.

For retirees as a whole, 82% of the mean difference in 2008 and 2012 can be ascribed to differences of composition following the different factors taken into account for the calculation. Out of this total, the duration and the wage are by far the strongest explanatory factors, since they account for 23% and 36% of the mean difference respectively in 2008, 20% and 35% in 2012. The effect of the bonus for children is always close to zero. Lastly, the other composition effects (share of retirees previously not working due to disability and cohort composition) are positive and therefore work in favor of women, but explain only a very small part of the gap. There remains a residual – or unexplained gap – of 17% of the total in favor of men in 2008 and 2012.

When we analyze separately the different schemes, we find that pension gaps are on average much lower in the public sector (for pensioners on either the SRE or the CNRACL scheme) than in the private sector (General Scheme), which includes the women with the most fragmented and least favorable careers, and who most often had periods of inactivity.

In each pension scheme, the unexplained share of the gap is much lower for single-sector retirees than for the group of (single-sector and multi-sector) retirees considered as a whole. This is particularly true for single-sector retirees of the General Scheme. This results from the fact that the link between duration, reference wage and pension is more complex for multi-sector retirees. Indeed, their benefits are computed independently from each other, which amplifies the non-linearities discussed above.

For each scheme, the differences in composition mainly come from differences in terms of duration and wages. Overall, the contribution of those two factors is smaller in the public schemes than in the private, because of the greater homogeneity of careers. The

differences between men and women in terms of career duration are much smaller in the two public sector schemes, both because short careers are excluded and because the proportion of women with full careers is higher than in the private sector.

Let us now turn our attention to the other factors. The contribution of differences in retirement age is negligible in the public sector. It remains low, but to women's advantage, in the General Scheme. This is because for retirees as a whole (both sexes) it is generally advantageous to retire at the age of 65 rather than before (particularly for women), and women are more numerous at this age.[6] With the exception of retirees under the CNRACL scheme (especially single-sector retirees), differences in cohort structure have little effect. This factor contributes to 7% of the pension gap for single-sector retirees on the CNRACL scheme, and 8% for all retirees on this scheme. The proportion of parents with 3 or more children has negligible impact. Differences in the proportion of persons in situations of invalidity/incapacity have little effect, except for retirees on the General Scheme, and they tend to reduce the average pension gap.

The mechanism that is certainly the strongest generator of non-linearities is the contributory/guaranteed minimum. For people with a long career but low wages, it is likely to weaken the link between the pension amount and the reference wage. In every case, we expect the introduction of the contributory/guaranteed minimum to increase the explained share of the model, insofar as far more women than men benefit from this measure. Note that this variable is not a characteristic of the individual per se, unlike the reference wage and duration of activity; it is a characteristic of the pension system (i.e., the calculation formula). Nevertheless, introducing it allows us to take the non-linearities into account more effectively.

[6] Full rate is obtained in the private sector (and in the public sector since 2003) either when the number of quarters reaches a certain threshold (which now depends on the cohort) or when the worker reaches 65 years (now 67). This generates two peaks (65 years and 60 years which was the minimum age – there is another minimum age at 55 in the public sector for certain categories of workers). This rule means that for a given duration (below the threshold) and a given wage, the pension amount is higher for workers who retire at 65 (at full rate) than at 64. Additionally retiring at full rate allows retirees to benefit from the minimum pension, which further increases the advantage at retiring at 65, For most already retired cohorts, the 65 years peak mainly concerns women, because men generally get the full rate by reaching the minimum number of quarters before 65.

Since a higher proportion of women than men receive the contributory/guaranteed minimum, up to fairly high levels in the distribution of pension incomes (especially under the General Scheme) and since, all else being equal, the contributory minimum has the effect of increasing the pension, we expect these differences to work to the advantage of women in the total pension gap. The effects are only important for single-sector retirees under the General Scheme and, to a lesser extent, for General Scheme retirees as a whole (single- and multi-sector). This also has the effect of slightly reducing the contribution of the other observable variables, but of increasing the contribution of wages, chiefly for single-sector retirees under the General Scheme.

4.2. Decomposition of the variation between 2008 and 2012

Tables 2a, 2b and 2c report the average pension gap by age and gender in 2008 and 2012, for the whole sample, then for the private sector and finally for the public sector, and their decompositions. As expected, the average gender pension gap is smaller in the public sector (around 20 to 30% in 2008, 17 to 21% in 2012) than in the whole sample (around 50 to 75% in 2008; 45% to 63% in 2012). There is a decrease in the gender pension gap between 2008 and 2012, which is quite pronounced in the whole sample (around 13 points), and more limited in the public sector (around 4 points). When we observe the gap across age groups (lines gap08 and gap12), we note an increase of this gap when retirees are older, for the whole sample as well as for the public sector, in 2008 as well as in 2012: the oldest have smaller pensions than the youngest, and this trend is more pronounced for women than for men.

We also report the decomposition of the variation of the gender pension gap into the different components: career duration, reference wage, age at retirement, number of children, invalidity, born abroad, and minimum pension entitlement. The two other components are the variation of the parameters (line var_parameters) and the variation of the gender effect.

To help the interpretation, the results of the decomposition of the variation of the gender pension gap (in €2008, expressed as a log), are summed up in figure 3a (whole sample) and in figure 3b (public sector only). We report all terms of the change in the gender pension gap by age. We distinguish the main characteristics (career duration and reference wage) and "other characteristics" include all remaining characteristics. A positive change in all these components for men widens the pension gap; while a positive change for women narrows the gap, so it is reported on a negative scale.

Generally women have better work characteristics at each age in 2012, compared to 2008, in terms of career duration and reference wage. These improvements more than compensate better characteristics of men (for men, the improvements are mainly in terms of the reference wage). As expected changes in the parameters have a very limited effect, as the parameters are gender neutral. Finally the gender effect tends to reduce the gender pension gap; these results are attributable to non linearities in the calculation of the pension. As mentioned earlier, some "quarters" in the working life used to calculate the length of contribution are less rewarded than others. Specifically some quarters are attributed because of children, but do not change the reference wage. So this gender effect in our decomposition probably reflects the more continuous career of the most recent female cohorts.

When looking at the public sector, the analysis is slightly different. The reference wage for both men and women increased between 2008 and 2012, at each age, so the positive impact on pensions for women is offset by a similar trend for men. Women also have longer contribution periods in 2012 than in 2008, but the increases are quite limited, as the careers of retired women in the public sector were already long in 2008. So the main way to reduce the gender pension gap in this sector might be to promote better access to the best paid positions.

Concluding remarks

In France, women's pensions are roughly half those of men on average, around 60% in the private sector pension schemes and 80% in the public sector schemes in 2008 and

2012. This paper analyzes the main components of pension levels and of these gender gaps using a detailed and rich administrative data set. As expected, the length of contributions, which is shorter for women, and the difference in the reference wage (again lower for women) are the main determinants of this gap. Policies designed to reduce pension inequality have a very limited effect on the gender pension gap.

When we analyze the changes in the gender pension gap between 2008 and 2012 for cohorts of the same age, we find that the (slight) decrease is mainly due to improved female characteristics which more than offset the improvement in male characteristics. It is also interesting to underline the fact that some of the quarters for women were better rewarded between 2008 and 2012. This probably reflects fewer career interruptions for parental reasons and indicates the long-term effect of decisions taken at an earlier period. This also confirms that reconciliation policies are probably the most powerful tool for reducing the gender pension gap.

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Table 1. Decomposition of mean differences in pension (in log) for the whole stock and by type of retiree in 2008 and 2012

2008	All		Private			SRE			CNRACL	
		All	Mono	Poly	All	Mono	Poly	All	Mono	Poly
Men	7,168	7,100	7,039	7,183	7,659	7,700	7,604	7,366	7,360	7,367
Women	6,553	6,374	6,335	6,489	7,448	7,496	7,326	7,131	7,082	7,171
Total gap	-0,614	-0,726	-0,704	-0,694	-0,211	-0,204	-0,278	-0,235	-0,278	-0,196
Explained gap	-0,507	-0,573	-0,662	-0,390	-0,173	-0,193	-0,211	-0,197	-0,266	-0,153
duration	-0,231	-0,279	-0,236	-0,182	-0,071	-0,074	-0,034	-0,157	-0,183	-0,078
wage	-0,359	-0,390	-0,651	-0,228	-0,095	-0,121	-0,164	-0,038	-0,099	-0,078
retirement age	0,008	0,017	0,014	0,002	-0,001	0,001	-0,002	0,007	0,003	0,008
children	-0,001	0,000	0,000	0,001	-0,006	-0,002	-0,011	-0,004	0,006	-0,006
invalidity	0,007	0,012	0,016	0,002	0,000	0,001	0,001	0,000	-0,001	0,002
origin	0,015	0,018	0,018	0,012	0,000	0,000	0,000	0,000	0,000	0,000
cohorts	0,005	0,007	0,007	0,001	0,000	0,002	0,000	-0,007	-0,007	0,002
minima	0,047	0,043	0,170	0,001	0,000	0,000	0,000	0,002	0,016	-0,003
Explained share	82,5	78,9	93,9	56,2	81,7	94,7	75,818	83,565	95,627	77,802
Unexplained part	-0,107	-0,153	-0,043	-0,304	-0,039	-0,011	-0,067	-0,039	-0,012	-0,044
Unexplained share	17,5	21,1	6,1	43,8	18,3	5,3	-0,067	-0,039	-0,012	-0,044

2012	All		Private			SRE			CNRACL	
		All	Mono	Poly	All	Mono	Poly	All	Mono	Poly
Men	7,236	7,167	7,095	7,278	7,728	7,765	7,681	7,427	7,435	7,425
Women	6,669	6,492	6,456	6,603	7,521	7,571	7,417	7,211	7,168	7,243
Total gap	-0,567	-0,676	-0,639	-0,675	-0,207	-0,194	-0,265	-0,215	-0,267	-0,182
Explained gap	-0,465	-0,532	-0,619	-0,369	-0,171	-0,181	-0,207	-0,182	-0,239	-0,142
duration	-0,199	-0,240	-0,182	-0,179	-0,066	-0,071	-0,031	-0,138	-0,158	-0,073
Wage	-0,353	-0,394	-0,671	-0,206	-0,099	-0,116	-0,163	-0,043	-0,090	-0,076
retirement age	0,007	0,013	0,004	0,007	-0,001	0,002	-0,003	0,011	0,009	0,009
Children	0,000	0,000	0,000	0,001	-0,005	-0,001	-0,011	-0,003	0,003	-0,004
invalidity	0,010	0,015	0,019	0,003	0,001	0,001	0,002	0,001	-0,002	0,002
Origin	0,018	0,020	0,022	0,008	0,000	0,000	0,000	0,000	-0,001	0,000
Cohorts	0,003	0,005	0,007	-0,002	-0,001	0,002	-0,001	-0,015	-0,017	0,004
Minima	0,049	0,049	0,182	0,000	0,000	0,002	0,001	0,005	0,018	-0,002
Explained share	82,01	78,68	96,88	54,62	82,57	93,15	78,23	84,57	89,57	77,96
Unexplained part	-0,102	-0,144	-0,020	-0,306	-0,036	-0,013	-0,058	-0,033	-0,028	-0,040
Unexplained share	17,99	21,32	3,12	45,38	17,43	6,85	21,77	15,43	10,43	22,04

Table 2a. Variation of mean differences in pension (in log) between 2008 and 2012 - All retirees

		Age 66	Age 68	Age 70	Age 72	Age 74
Cohort	**2008**	**1942**	**1940**	**1938**	**1936**	**1934**
Cohort	**2012**	**1946**	**1944**	**1942**	**1940**	**1938**
	Male 08	7,148	7,135	7,151	7,103	7,144
	F08	6,646	6,570	6,507	6,431	6,386
	Gap08	0,502	0,565	0,644	0,673	0,758
	H12	7,196	7,132	7,101	7,088	7,139
	F12	6,743	6,677	6,656	6,567	6,513
	Gap12	0,452	0,454	0,445	0,521	0,627
Delta	**Var_Gap**	-0,050	-0,111	-0,199	-0,152	-0,132
	var_XM:duration	0,059	0,029	-0,016	0,007	-0,015
	var_XM:wage	0,022	0,028	0,010	0,018	0,005
	var_XM:retire. age	0,020	0,010	0,000	0,008	0,011
	var_XM:children	-0,002	-0,002	0,001	0,001	-0,002
	var_XM:invalidity	-0,004	-0,002	-0,002	-0,004	-0,008
	var_XM:origin	0,010	-0,003	-0,007	-0,006	-0,005
	var_XM:minima	-0,005	-0,009	-0,003	-0,002	0,000
Term 1	**var_XM:total**	0,101	0,050	-0,019	0,022	-0,013
	var_XF:duration	-0,081	-0,067	-0,081	-0,084	-0,069
	var_XF:wage	-0,048	-0,046	-0,046	-0,046	-0,029
	var_XF:retire. age	-0,002	-0,002	0,002	-0,003	-0,004
	var_XF:children	0,002	0,002	0,002	0,001	0,001
	var_XF:invalidity	0,006	0,004	0,002	0,003	0,004
	var_XF:origin	-0,006	0,001	0,006	0,003	0,003
	var_XF:minima	0,008	0,003	0,002	0,000	-0,004
Term 2	**var_XF:total**	-0,120	-0,105	-0,112	-0,125	-0,098
Term 3	**var_parameters**	-0,005	-0,001	0,012	0,014	0,002
Term 4	**var_gender effect**	-0,026	-0,055	-0,080	-0,064	-0,023

Table 2b. Variation of mean differences in pension (in log) between 2008 and 2012

Private sector

		Age 66	Age 68	Age 70	Age 72	Age 74
Cohort	**2008**	**1942**	**1940**	**1938**	**1936**	**1934**
Cohort	**2012**	**1946**	**1944**	**1942**	**1940**	**1938**
	Male 08	7,075	7,060	7,084	7,041	7,079
	F08	6,471	6,401	6,341	6,278	6,238
	Gap08	0,604	0,659	0,743	0,763	0,841
	H12	7,125	7,054	7,024	7,006	7,072
	F12	6,570	6,501	6,486	6,400	6,350
	Gap12	0,555	0,553	0,537	0,606	0,722
Delta	**Var_Gap**	-0,049	-0,106	-0,205	-0,157	-0,119
	var_XM:duration	0,068	0,032	-0,022	0,002	-0,020
	var_XM:wage	0,020	0,026	0,006	0,010	0,004
	var_XM:retire. age	-0,002	0,000	0,002	0,011	0,017
	var_XM:children	-0,002	-0,002	0,001	0,001	-0,001
	var_XM:invalidity	-0,005	-0,002	-0,003	-0,006	-0,011
	var_XM:origin	0,011	-0,004	-0,008	-0,007	-0,006
	var_XM:minima	-0,007	-0,009	-0,003	-0,001	0,000
Term 1	**var_XM:total**	0,084	0,042	-0,027	0,009	-0,016
	var_XF:duration	-0,087	-0,070	-0,086	-0,086	-0,070
	var_XF:wage	-0,045	-0,034	-0,032	-0,028	-0,007
	var_XF:retire. age	0,006	0,003	0,005	-0,002	-0,007
	var_XF:children	0,002	0,002	0,002	0,001	0,000
	var_XF:invalidity	0,007	0,004	0,003	0,004	0,005
	var_XF:origin	-0,006	0,002	0,008	0,004	0,004
Term 2	**var_XF:total**	-0,113	-0,091	-0,101	-0,107	-0,080
Term 3	**var_parameters**	0,007	0,006	0,017	0,017	-0,002
Term 4	**var_gender effect**	-0,027	-0,063	-0,096	-0,075	-0,021

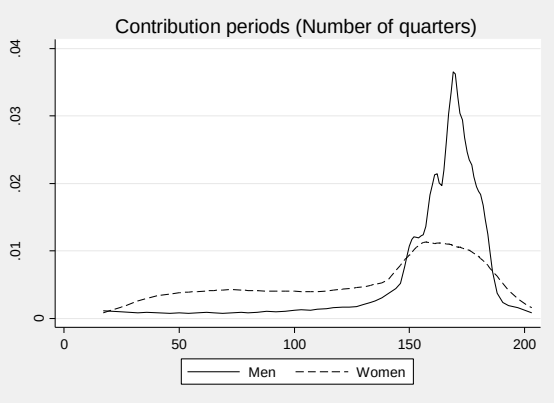
Table 2c. Variation of mean differences in pension (in log) between 2008 and 2012

Public sector

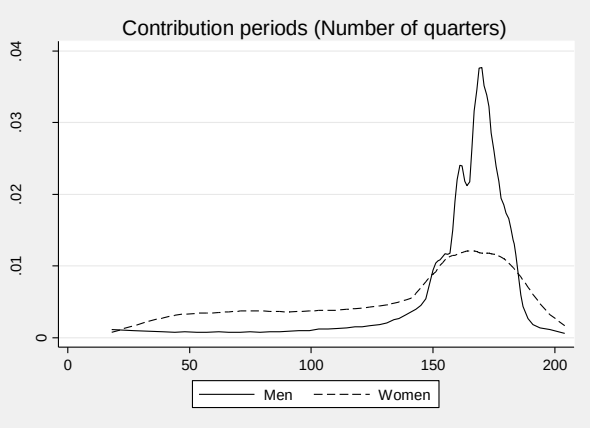
		Age 66	Age 68	Age 70	Age 72	Age 74
Cohort	**2008**	**1942**	**1940**	**1938**	**1936**	**1934**
Cohort	**2012**	**1946**	**1944**	**1942**	**1940**	**1938**
	Male 08	7,719	7,719	7,710	7,700	7,723
	F08	7,518	7,508	7,494	7,472	7,406
	Gap08	0,201	0,211	0,216	0,228	0,317
	H12	7,688	7,722	7,728	7,737	7,712
	F12	7,519	7,531	7,523	7,512	7,500
	Gap12	0,169	0,191	0,205	0,226	0,213
Delta	**Var_Gap**	-0,032	-0,020	-0,011	-0,002	-0,104
	var_XM:duration	0,012	0,009	0,003	0,004	-0,005
	var_XM:wage	0,051	0,065	0,085	0,096	0,078
	var_XM:retire. age	0,001	0,001	0,002	0,000	-0,003
	var_XM:children	-0,003	0,000	-0,001	-0,005	-0,013
	var_XM:invalidity	0,000	-0,001	0,000	-0,001	-0,001
	var_XM:origin	0,000	0,000	0,000	0,000	0,000
	var_XM:minima	0,002	0,001	0,003	-0,001	-0,001
Term 1	**var_XM:total**	0,062	0,075	0,092	0,095	0,055
	var_XF:duration	-0,038	-0,025	-0,024	-0,023	-0,015
	var_XF:wage	-0,053	-0,069	-0,073	-0,091	-0,148
	var_XF:retire. age	-0,001	0,001	-0,001	0,001	0,000
	var_XF:children	0,001	0,003	0,002	0,006	0,006
	var_XF:invalidity	0,001	0,001	0,000	0,001	0,001
	var_XF:origin	0,000	0,000	0,000	0,000	0,000
	var_XF:minima	-0,004	-0,001	0,000	0,001	0,004
Term 2	**var_XF:total**	-0,094	-0,091	-0,097	-0,105	-0,151
Term 3	**var_parameters**	0,008	0,006	0,012	-0,001	-0,004
Term 4	**var_gender effect**	-0,007	-0,011	-0,019	0,009	-0,004

Figure 1a. Distribution of career duration by sex, 2008 and 2012

2008



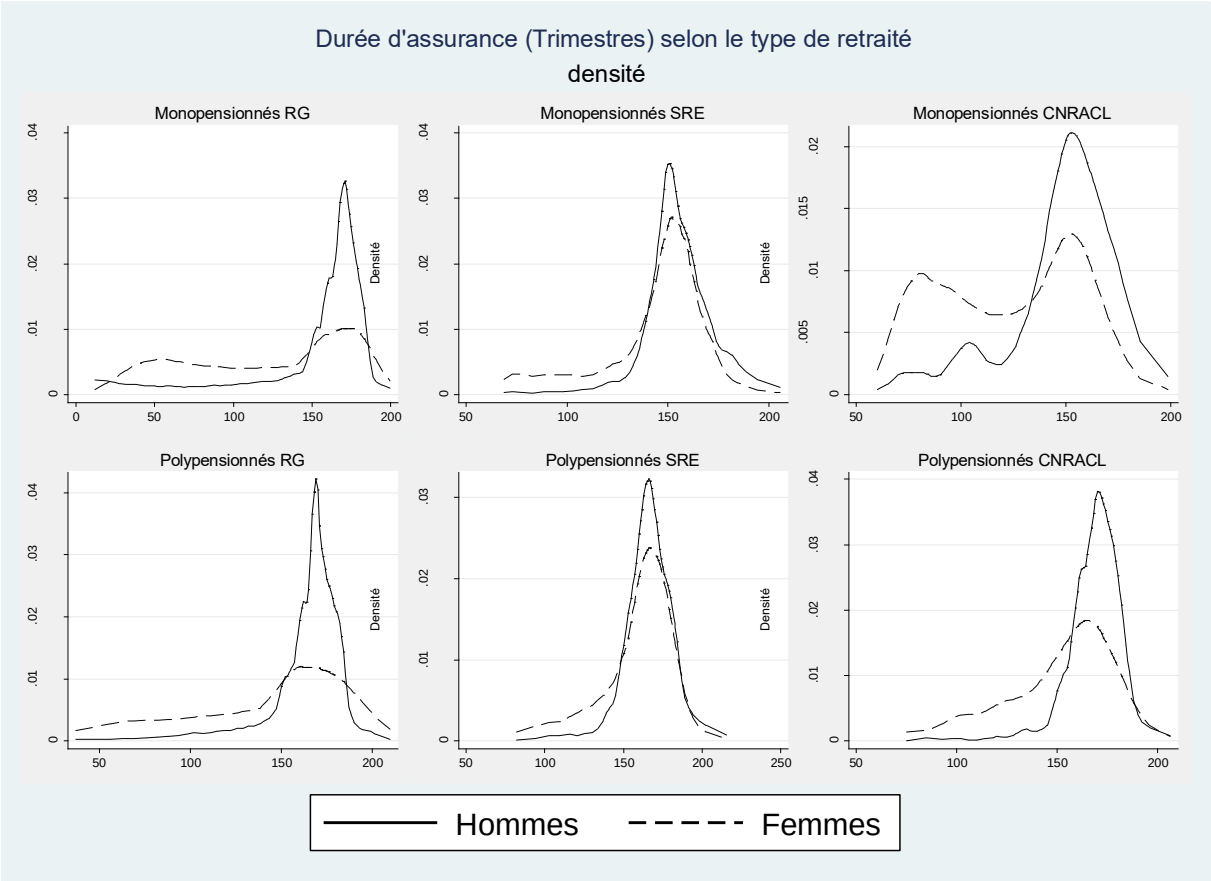
2012



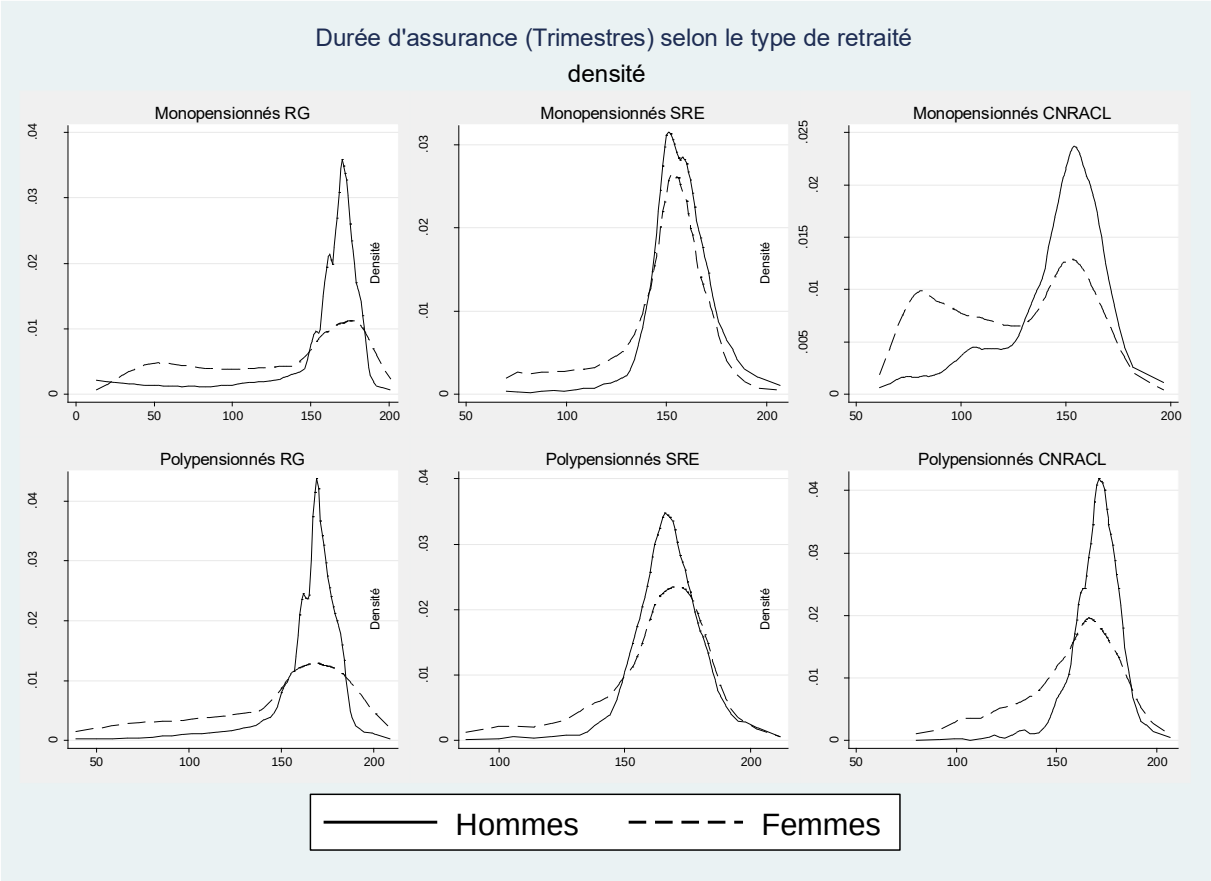
VERSION ANGLAISE des graphiques à mettre

Figure 1b. Distribution of career duration by sex and type of retirees, 2008 and 2012

2008



2012


Durée d'assurance (Trimestres) selon le type de retraité
densité
Monopensionnés RG
Monopensionnés SRE
Monopensionnés CNRACL
Polypensionnés RG
Polypensionnés SRE
Polypensionnés CNRACL
Densité
Hommes
Femmes

PAS TROUVE LA VERSION ANGLAISE

Attention : ci-dessous, ce sont des distributions de pension

Figure 2a. Distribution of reference wages by sex, 2008 and 2012

2008 2012

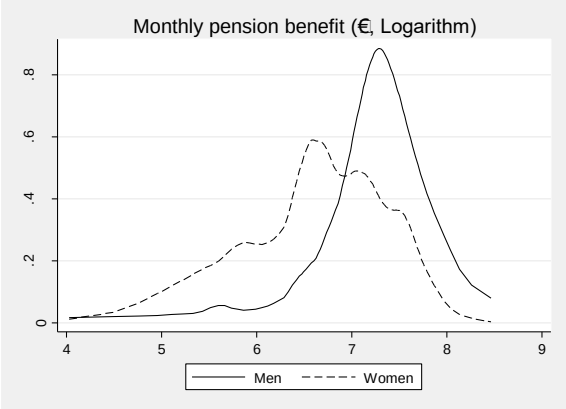
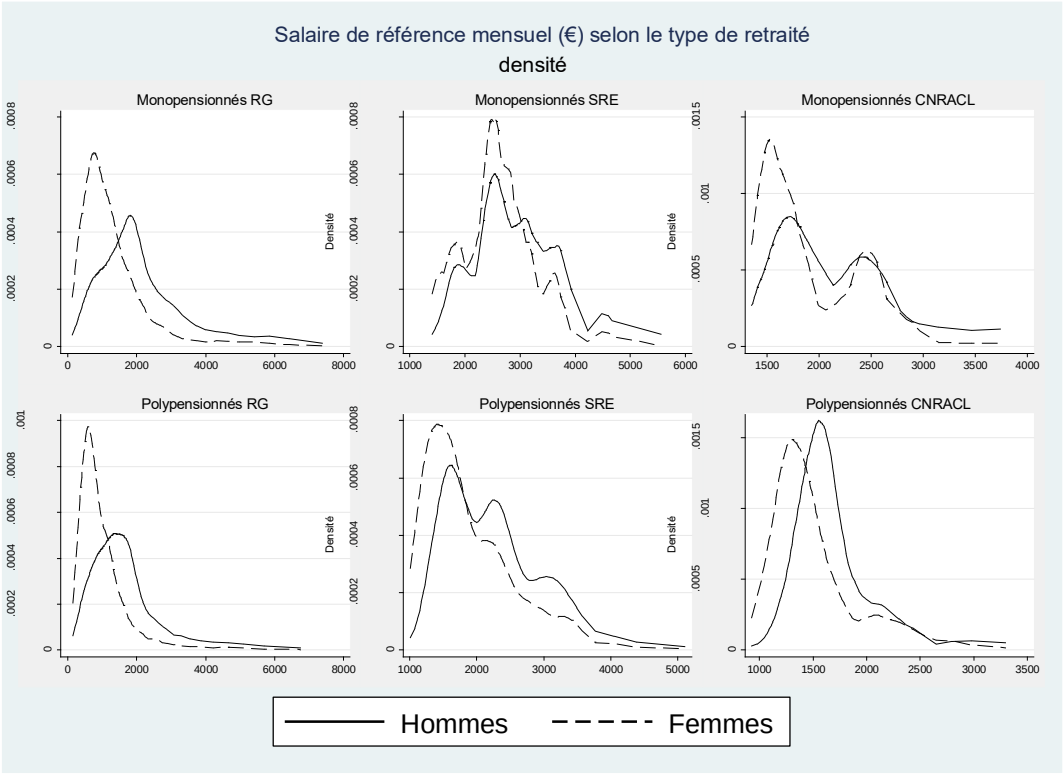


Figure 2b. Distribution of reference wages by sex and type of retirees, 2008 and 2012

2008



2012

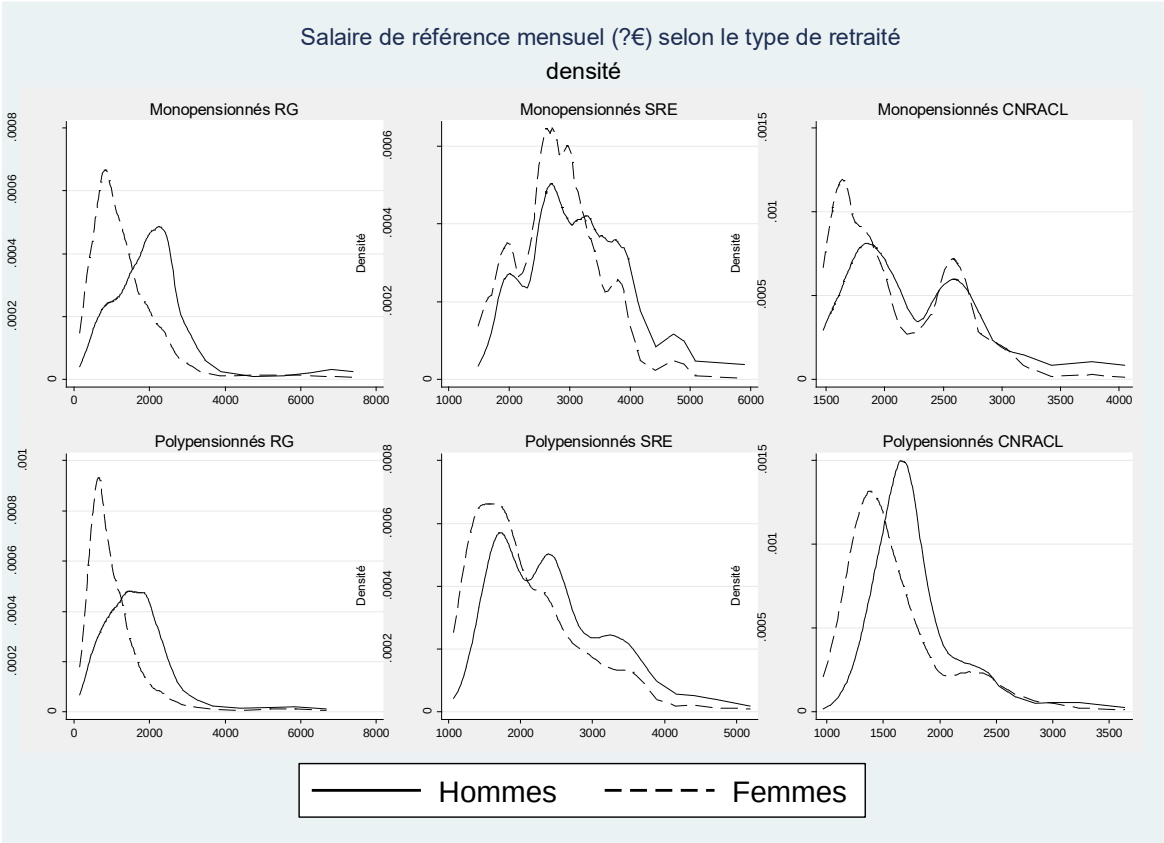
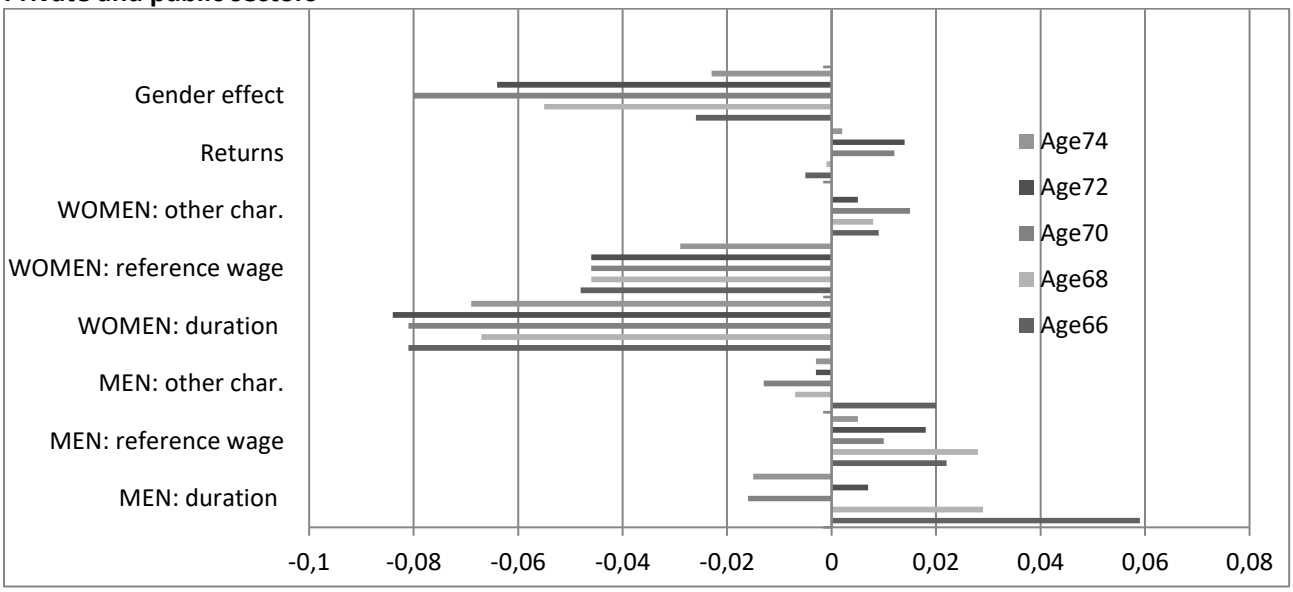
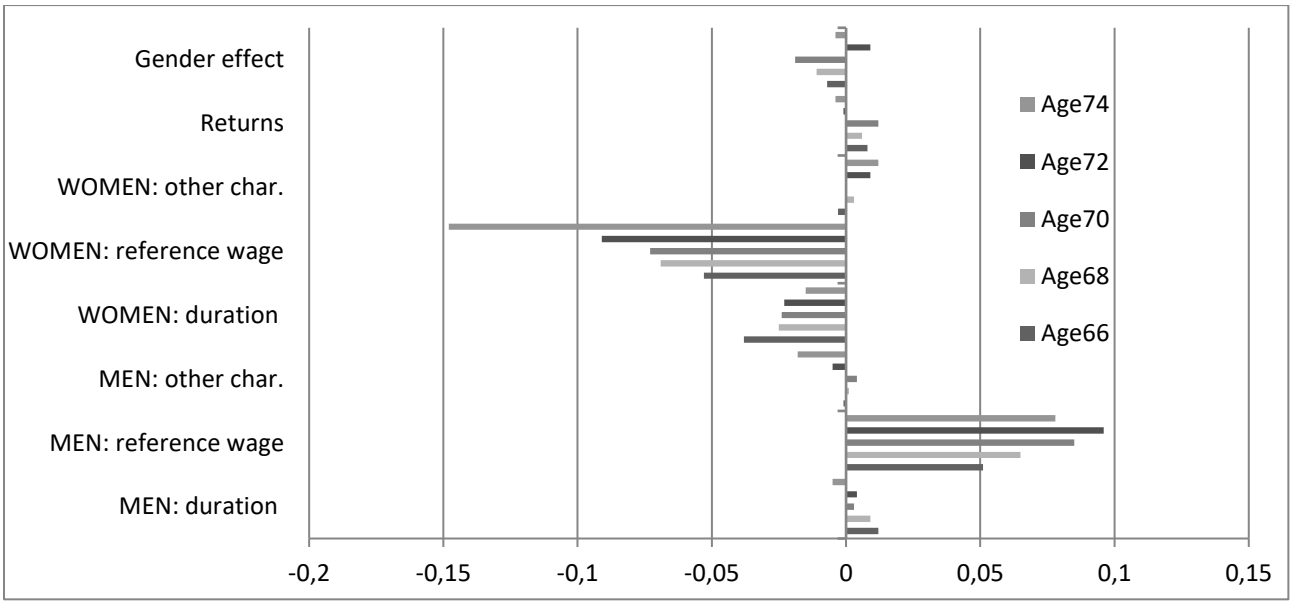


Figure 3a – Components of the change in the gender pension gap by age, between 2008 and 2012 – Private and public sectors



Sources: EIR 2008 and 2012 – logarithm of monthly own benefits, in €2008.

Figure 3b – Components of the change in the gender pension gap by age, between 2008 and 2012 – Public sector



Sources: EIR 2008 and 2012 – logarithm of monthly own benefits, in €2008.