

Intergenerational inequalities in mortality-adjusted disposable incomes

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Abstract

This article analyses the development of inequalities between the generations in France using a composite indicator including income and life expectancy. Mortality-adjusted disposable income has greatly increased over the generations. However, a breakdown by sex shows that this increasing trend is attributable to rapid growth in women's income, while men's income has stagnated for all cohorts born since 1946.

1 Introduction

The economic position of young people is a recurring topic in public debate. It is often said that today's younger cohorts are less well off than their parents were at the same ages. This supposed inequality between the generations is likely to affect the design of policies that involve intergenerational transfers. In previous research for France, we showed that there was no decline in living standards between the generations; and, in particular, that the baby boom generation did not enjoy a more favourable position than the generations that followed them (d'Albis and Badji 2017). The various indicators of living standards we used are, however, only economic indicators. Such indicators are obviously imperfect measures of well-being, as they may fail to capture an individual's perception of his or her position. In this article, we continue our analysis of inequalities between the generations in France by adding two specifically demographic dimensions.

The first dimension we include is life expectancy. As it is clear that improvement in this variable is a barometer of progress and a source of well-being (Deaton 2013), it is often included in composite indicators used to measure well-being. However, linking an economic variable to a demographic variable is not a simple process. As Deaton (2013) has pointed out, it would be inappropriate to merely multiply

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annual income by life expectancy. For a given permanent income level, an increase in lifespan may indeed be accompanied by a reduction in consumption per period of time. In the following, we use recent literature (Becker et al. 2005; Fleurbaey and Gaulier 2009; Jones and Klenow 2016; d'Albis and Bonnet 2018) based on agents' preferences to incorporate differences in life expectancy into comparisons of income levels between countries. Following the literature on computing the Value of a Statistical Life, the idea behind our approach is to define how much an individual would be willing to pay in exchange for a higher life expectancy. We could, for example, ask how much income an individual would agree to forego in order to enjoy a life expectancy equal to that of the country with the highest average lifespan (d'Albis and Bonnet 2018). The income net of this willingness to pay for a longer life is referred to as "mortality-adjusted income". In this article, we adapt this procedure in order to examine inequalities between the generations. We determine the willingness to pay for each age and each cohort as a function of the life expectancy at that age for a cohort distant in time. For example, we calculate the reduction in income a young person of the baby boom generation might have agreed to forego in exchange for enjoying the life expectancy of their children.

The second dimension we include is gender. Men and women have widely differing incomes and life expectancies, with men, on average, having higher incomes but shorter lives than women. Including this dimension in comparisons of generations has two advantages. First, since variations by gender change over time, examining these differences is one way to better understand average developments. Second, the intergenerational comparisons made by the ordinary person may be implicitly gendered: i.e. a son may compare himself to his father, while a daughter is likely to compare herself to her mother. Even if such gendered comparisons are not universal, this tendency could help to explain the perceptions expressed in surveys.

We used the seven waves of the main French survey of household living conditions to create pseudo cohorts. Unfortunately, we were unable to analyse real cohorts because the survey is not panel-based. The respondents' total incomes were individualised and adjusted using National Accounts. Our econometric modelling is designed to evaluate the effects of age, cohort, and period on disposable income and mortality-adjusted disposable income. To address the problem of collinearity between the explanatory variables, we have adopted Deaton and Paxson's (1994) strategy.

The results are as follows. With the inclusion of increased life expectancy, the relative situations of generations improved considerably during our period of observation. In particular, all of the cohorts born after 1960 enjoyed a level of mortality-adjusted disposable income that was significantly higher than that of the cohort born in 1946. For example, from the 1946 cohort to the 1966 cohort, income rose 28.6%. However, this increase reflects widely differing trends between the sexes. Women's mortality-adjusted income rose quickly (+38.8% from the 1946 to the 1966 cohort, and +76.6% from the 1926 to the 1946 cohort), while men's income stagnated starting with the 1946 cohort. These findings clearly indicate that women's income levels have been catching up to those of men. Moreover, these

results are in line with our previous research that focused on men alone (Lefranc 2018, Alesina et al. 2018). We can also see that mortality-adjusted disposable income generally increased over the course of an average lifetime, rising 53% from ages 27 to 47, 7.3% from ages 47 to 62, and 50.1% from ages 62 to 82. This means that inequalities between ages did not involve inequalities between generations. As d'Albis and Badji (2017) have suggested, economic growth benefits everyone.

The rest of the paper is organised as follows. Section 2 presents the methods we use to obtain our mortality-adjusted incomes, and our econometric strategy. Section 3 presents our results. Section 4 concludes.

2 Data, measures, and estimation strategy

Our indicator combines an economic variable that measures living standards and a demographic indicator that measures longevity. There is no consensus on this choice of economic variable. It is true that in most theoretical economic studies, consumption is used as the main element in an individual's utility function. This variable has, for example, been used by Jones and Klenow (2016) to compare levels of well-being between countries, and by d'Albis and Badji (2017) to compare well-being between generations. In this article, however, we use disposable income. Unless one accepts the Keynesian theory of a linear connection between consumption and income, this is not a neutral choice. Consumption is both a more extensive variable because it depends on total income received over a life-cycle, and a more restricted variable because it does not include any bequests transmitted to children. d'Albis and Badji (2017) showed, however, that comparisons between generations do not differ qualitatively depending on which variable is used, with the exception that the improvement in living standards between generations is more marked when consumption is used. We have redone this comparison for the present paper (see Appendix B), and found that this conclusion still holds. But our decision to use the disposable income in the current analysis is largely a pragmatic one: i.e. since we are constructing variables for both sexes, income is the more appropriate choice because it is more individualised in surveys. Consumption is, by contrast, generally recorded for the household as a whole. When consumption is individualised, the tendency is to divide it equally among adults. While this approach can generate accurate results, it masks the important dimension of gender inequality. The reduction in the income gap between the sexes, which has undoubtedly led to improvements in women's well-being, would not be discernible if well-being were measured by average household consumption.

2.1 Disposable income by age and cohort

Disposable income is defined as an individual's income after the deduction of taxes and social security contributions. It includes: (i) working income: salaries,

self-employed income, etc.; (ii) income from household worth: dividends, interest, rent, etc., to which we add the imputed rents; (iii) social security benefits, including pension and unemployment benefits; and (iv) current transfers, particularly insurance indemnities minus premiums and transfers between households.

We first compute disposable income using data from the French Household Expenditure Survey (*Budget de famille*, referred to hereafter as BdF) waves conducted in 1979, 1984, 1989, 1995, 2000, 2005, and 2010. With more than 10,000 participating households, the aim of these surveys was to reconstitute all household accounts by gathering information on the respondents' income and expenditure levels. It is worth noting that in the BdF, a household refers to any group of people who ordinarily share a dwelling and a budget, and who may or may not be related.

We estimate each household's disposable income by adding up all sources of income and deducting any direct taxes paid (income tax, council tax, property tax). As the BdF surveys conducted between 1979 and 1995 did not provide figures for imputed rents, these figures were estimated using the characteristics of housing; as in d'Albis and Badji (2017). All of the variables are deflated using the consumer price index.

Unlike in d'Albis and Badji (2017), in the current analysis we individualise the disposable income following the recommendations made by the National Transfer Accounts (United Nations 2013). The BdF surveys provide some income data at the household level (such as property income, imputed rents, family benefits, transfers between households, and direct taxes paid), and other income data at the individual level. The household-level data are allocated between the members of the household using a sharing rule. Property income, transfers between households, direct taxes, and family benefits¹ are allocated equally between the household reference person and his or her spouse. Imputed rents are allocated using the NTA rule.

To enable us to compare data within a consistent time frame, we adjust the survey data to the French System of National Accounts aggregates. This adjustment, which is similar to the adjustment carried out for the National Transfer Accounts (d'Albis et al. 2015; 2017), ensures that the aggregate disposable income of individuals is equal to the National Accounts aggregates. Our sample is restricted to ordinary households residing in Metropolitan France. Finally, the rescaled individual variables are split by sex.

Figure 1 shows the disposable income by age for 16 generations. These generations are established using the seven cross-sectional databases we created from the seven BdF surveys. We first built 79 annual cohorts, defined according to the reference individual's date of birth. The first cohort was born in 1901, while the last cohort was born in 1979. The generations are then defined using the mean of five consecutive cohorts (except for the first generation, which consists of four cohorts). Each line in Figure 1 represents a generation (e.g. 1947 represents all cohorts

¹ We do not allocate them to the children, as is recommended by the NTA, because here we are considering only individuals over age 25.

Figure 1(a):
Disposable income by age and cohort groups, constant euros, whole population

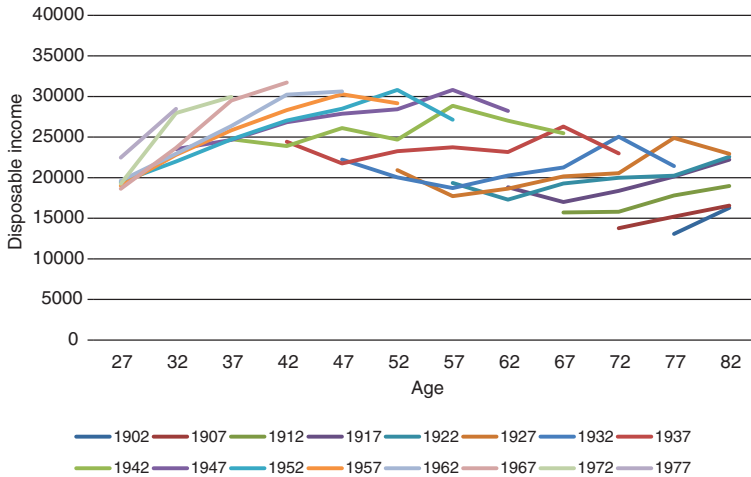
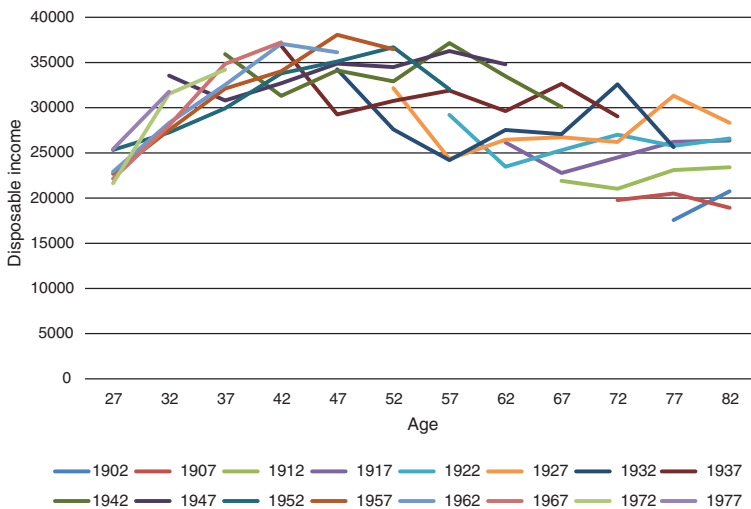


Figure 1(b):
Disposable income by age and cohort groups, constant euros, men



born between 1945 and 1949) at different ages (e.g. 57 represents the 55–59 age bracket).

Both for the whole population (Figure 1(a)) and for men alone (Figure 1(b)), income over the life-cycle forms an inverted U. Moreover, since the curves often

Figure 1(c):
Disposable income by age and cohort groups, constant euros, women

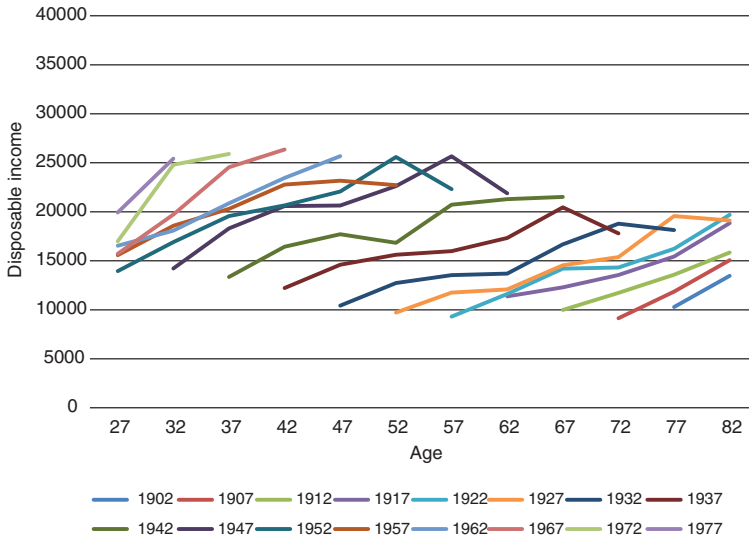
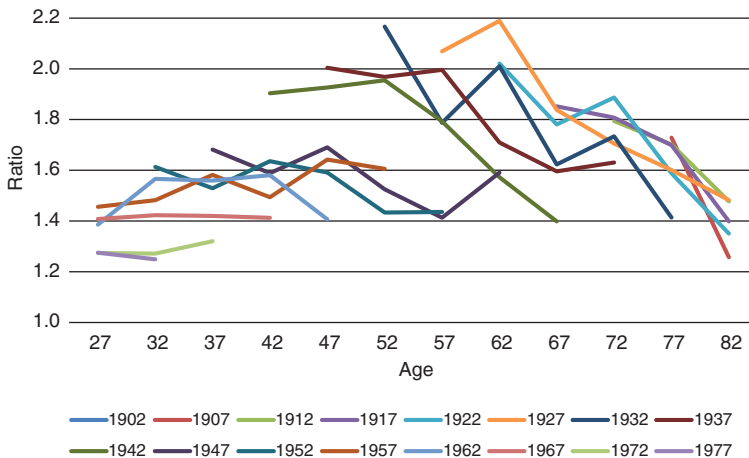


Figure 1(d):
Sex ratio of disposable incomes by age and cohort groups



cross, it is hard to come to any conclusion about income variation from one generation to the next. However, for women alone (Figure 1(c)), income appears to rise throughout an individual's lifetime, and clearly improves from generation to generation. But regardless of the age or generation, women's income is lower than

men's income. Figure 1(d) shows the ratio between men's and women's disposable income obtained from the data presented in Figures 1(b) and 1(c), except for the data from the 1979 survey. We can see that, for all ages and for all generations, this ratio is greater than one. Inequalities appear to decline from one generation to the next, with a sharp division emerging between those born before and after the Second World War.

2.2 Mortality-adjusted disposable income by age and cohort

The mortality-adjusted disposable income indicator is designed to include longevity gains by assigning them a monetary value. This value is determined by the reduction in income that would theoretically be accepted in exchange for enjoying a longer lifespan. Here, we adapt the method described in d'Albis and Bonnet (2018) by calculating the willingness to pay for a longer life at each age, and not just at birth.

Let us start with a life-cycle model with an uncertain lifespan, like those developed by Yaari (1965) and Barro and Friedman (1977), among others. The program of a representative agent of age $a = \{0, 1, \dots, T\}$ at date t is to maximise an intertemporal utility:

$$V_{a,t} = \sum_{i=a}^T \frac{1}{(1+\theta)^{i-a}} \frac{l_{i,t}}{l_{a,t}} u(c_{i,t+i-a}), \quad (1)$$

subject to an intertemporal budget constraint:

$$\sum_{i=a}^T \frac{1}{(1+r)^{i-a}} \frac{l_{i,t}}{l_{a,t}} c_{i,t+i-a} = w_{a,t} + \sum_{i=a}^T \frac{1}{(1+r)^{i-a}} \frac{l_{i,t}}{l_{a,t}} y_{i,t+i-a}. \quad (2)$$

Variables $c_{a,t}$, $y_{a,t}$, and $w_{a,t}$ represent consumption income and wealth at age a and date t . Moreover, $l_{i,t}/l_{a,t}$ is the probability of surviving to age i for an individual of age a , which is here approximated with period life tables. Finally, θ and r are the discount rate and interest rate, respectively. Assuming $\theta = r$, zero initial wealth and $y_{i,t+i-a} = y_{a,t}$, we find that the optimal consumption is constant and equal to income. The intertemporal utility can thus be written as:

$$V_{a,t} = u(y_{a,t}) a \left(\frac{l_{i,t}}{l_{a,t}} \right), \quad (3)$$

which corresponds to the product of the utility of income and the value of an annuity calculated using survival functions,

$$a \left(\frac{l_{i,t}}{l_{a,t}} \right) = \sum_{i=a}^T \frac{1}{(1+r)^{i-a}} \frac{l_{i,t}}{l_{a,t}}. \quad (4)$$

Following Fleurbaey and Gaulier (2009) and d'Albis and Bonnet (2018), we defined a mortality-adjusted income. The principle behind this approach is to calculate a willingness to pay, denoted $x_{a,t}$, by comparing for a given date the life expectancy at age a with the life expectancy that prevails at a late date, denoted t^* . This willingness to pay corresponds to the income an individual at date t would be willing to forego in order to enjoy the life expectancy at date t^* . It is calculated as follows:

$$u(y_{a,t})a\left(\frac{l_{i,t}}{l_{a,t}}\right) = u(y_{a,t} - x_{a,t})a\left(\frac{l_{i,t^*}}{l_{a,t^*}}\right), \quad (5)$$

where $y_{a,t} - x_{a,t}$ corresponds to our mortality-adjusted income, which solves:

$$y_{a,t} - x_{a,t} = u^{-1}\left(\frac{u(y_{a,t})a\left(\frac{l_{i,t}}{l_{a,t}}\right)}{a\left(\frac{l_{i,t^*}}{l_{a,t^*}}\right)}\right). \quad (6)$$

The greater the gap in life expectancy between t and t^* , the lower the mortality-adjusted income. Like Becker et al. (2005) and d'Albis and Bonnet (2018), we use a Constant Relative Risk Aversion utility function:

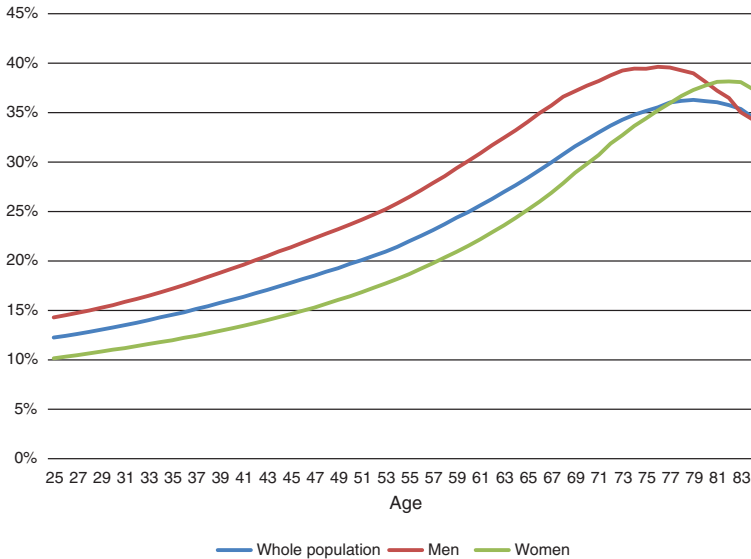
$$u(c) = \frac{c^{1-\frac{1}{\gamma}}}{1-\frac{1}{\gamma}} + \alpha, \quad (7)$$

and choose the following parameter values: $r = 0.03$, $\gamma = 1.25$, and $\alpha = -16.2$. The last two parameters are used in Becker et al. (2005), and enable us to match Murphy and Topel (2003)'s estimates of the Value of a Statistical Life. A robustness check for an alternative set of parameters reveals that the evaluation of the willingness to pay is sensitive to those parameters, but that estimations of age and cohort effects remain qualitatively robust (see Appendix B). Moreover, the dates we consider are those of the BdF surveys; i.e. $t = 1979, 1984, \dots, 2010$; while the ages are: $a = 25, 26, \dots, 84$.

The life expectancy by age statistics come from the Human Mortality Database. For reasons of data availability, we use the cross-sectional data. This approach probably underestimates the rise in life expectancy, and, consequently, the benefit to the youngest generations of this rise in life expectancy. As we shall see below, this approach does not undermine our econometric results. Indeed, because it is based cautious assumptions, it strengthens them.

Figure 2 shows the increase in life expectancy at each age from 1979 to 2010 for the whole population, men alone, and women alone. In line with recent mortality trends in most other developed countries, life expectancy in France rose with age, reaching 77 for men and 82 for women (Wilmoth and Horiuchi 1999). The increase was close to 40% by these ages, and then declined. At all ages between 25 and 80, the increase was significantly greater for men than for women.

Figure 2:
Increase in life expectancy at each age between 1979 and 2010



As calculated, willingness to pay was higher for men than for women, most likely because women’s life expectancy increased less than that of men. Furthermore, although the willingness to pay declined from one survey to another, it was relatively constant from one age group to another. For example, the share of disposable income men said they were willing to pay in exchange for enjoying a 2010 life expectancy was around 20% in 1979, and more than 10% in 1995. The corresponding shares for women were just over 9% and 4%. Figures 3(a), 3(b), and 3(c) show mortality-adjusted disposable income for, respectively, the whole population, men alone, and women alone. While the age profiles for income do not differ greatly from those in Figures 1(a), 1(b), and 1(c), the differences between the generations are clearer. Figure 3(d) also shows that the differences between men and women are smaller.

2.3 Estimation with pseudo panel data

Individual data can be used to distinguish the effects of age, cohort, and period, provided these are panel data that follow individuals throughout their entire life-cycle. Since our data are cross-sectional, we have built pseudo panels that group individuals belonging to the same cohort. We defined our cohorts using the “date of birth” variable, which resulted in 79 annual cohorts. The first cohort is made up of individuals who were born in 1901, and the last cohort cohort is made up

Figure 3(a):
Mortality-adjusted disposable income by age and cohort groups, constant euros, whole population

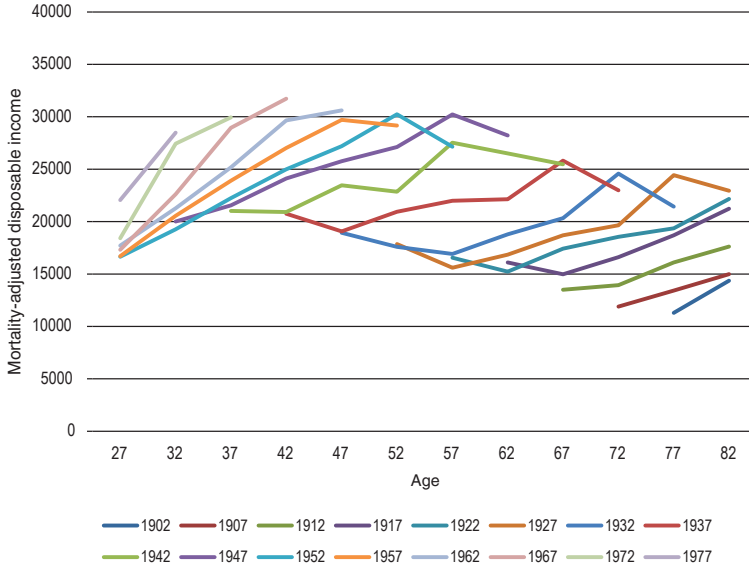


Figure 3(b):
Mortality-adjusted disposable income by age and cohort groups, constant euros, men

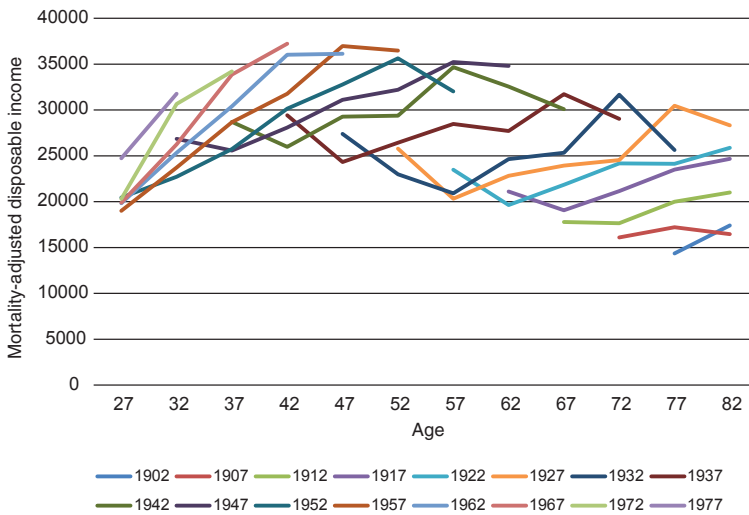


Figure 3(c):
Mortality-adjusted disposable income by age and cohort groups, constant euros, women

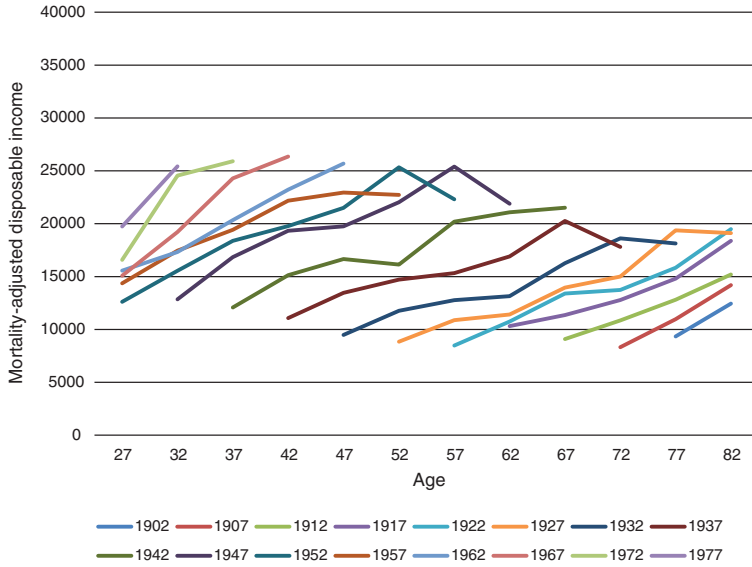


Figure 3(d):
Sex ratio of mortality adjusted disposable incomes by age and cohort groups

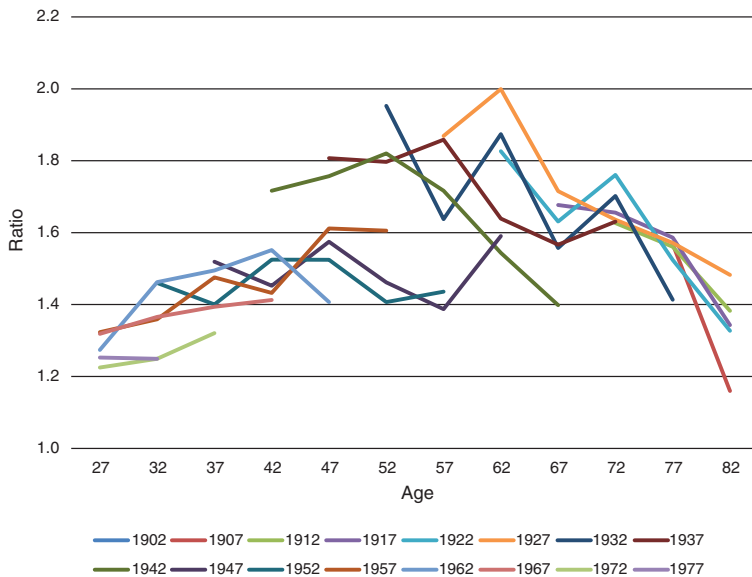


Table 1:
Size of observed cohorts

	All population	Women	Men
Number of cohort observations	407	407	407
Mean size of cohorts	288	150	138
Minimal size	39	24	15
Maximal size	574	305	277
Proportion of cohorts whose size is greater than 100	94%	80%	72%

of individuals who were born in 1979. Our pseudo panel includes 407 observations of our cohorts, because not all cohorts were observed in each survey, and the sizes of cohorts depended on the samples used (see Table 1). The observation numbers were small mainly for the older cohorts, and particularly for men, as their life expectancy was lower.

The simultaneous introduction of the “age”, “cohort”, and “period” variables in the estimation creates a collinearity problem because the survey year is equal to the sum of the “age” and “cohort” variables. As was noted in d’Albis and Badji (2017), various solutions to this problem have been proposed in the literature. We have chosen to follow the most common strategy: namely, that of Deaton and Paxson (1994). This approach imposes restrictions on the estimated parameters based on the assumption that period effects sum to zero, and are orthogonal to the long-term trend.

We assume that the three effects (age, cohort, and period) that we are seeking to estimate are additive. The model equation is written as follows:

$$\log \bar{y}_{jt} = \mu + \sum_i \alpha_i 1_{a_{jt}} + \sum_c \beta_c 1_{j=c} + \sum_t \gamma_t 1_{t=p} + \bar{\varepsilon}_{jt} \quad (8)$$

where \bar{y}_{jt} represents the explained variable related to cohort $j = 1901, 1902, \dots, 1979$ and survey dates $t = 1979, 1984, \dots, 2010$, $1_{a_{jt}}$ represent the indicators of the five-year age brackets from 25–29 years old to 80–84 years old associated with cohort j at date t , $1_{j=c}$ represent the indicators of the cohorts, and $1_{t=p}$ represent the indicators associated with survey dates t .

We estimated our equation for each of the variables of interest: disposable income and mortality-adjusted disposable income, both for the whole population and for men and women separately. Looking at Table 2, we can see that in all instances, the tests for fixed individual effects (which in our case are cohort effects, given by the term $\sum_c \beta_c 1_{j=c}$) were positive, which justifies our choice of a fixed effects model. More precisely, we estimated a Least Square Dummy Variable type fixed effects model.

Table 2:
Test for fixed individual effects and Hausman test

	Individual effects test		Hausman test	
	F-statistic	P-value	F-statistic	P-value
Disposable income				
All population	17.15	0.00	300.80	0.00
Men	5.76	0.00	229.98	0.00
Women	28.22	0.00	329.92	0.00
Mortality-adjusted disposable income				
All population	30.01	0.00	334.58	0.00
Men	14.13	0.00	286.38	0.00
Women	35.84	0.00	341.83	0.00

3 Results

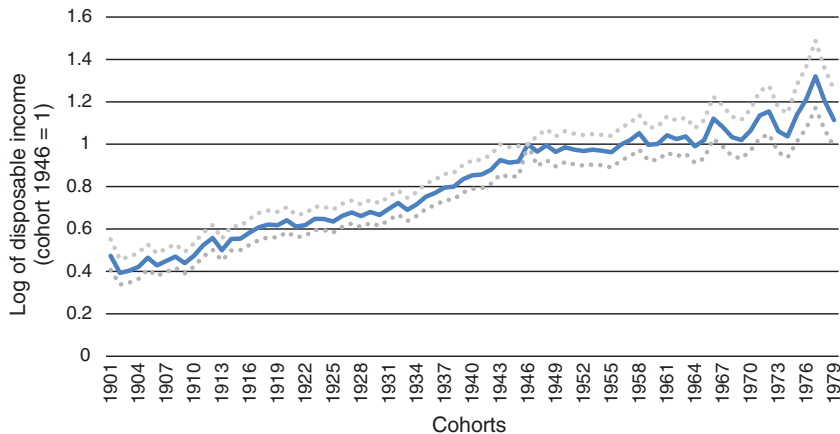
We now present our results by analysing in turn the cohort and the age effects on the two income measures presented above. We then provide a general discussion of the results. Period effects are not discussed here because they are not directly related to the research question of this article. All estimates are given in Appendix A.

3.1 Comparisons of incomes across cohorts

Figures 4, 5, and 6 represent the logarithm of the two incomes we consider as functions of the birth date when we control for age and period effects. Figure 7 covers the whole population, whereas Figures 8 and 9 refer to men and women, respectively. In each figure, panel (a) is the logarithm of the disposable income, and panel (b) is the logarithm of the mortality-adjusted disposable income. The results are expressed as a deviation from a reference cohort; i.e. the cohort born in 1946. Moreover, the grey lines delimit the confidence interval at the 5% level.

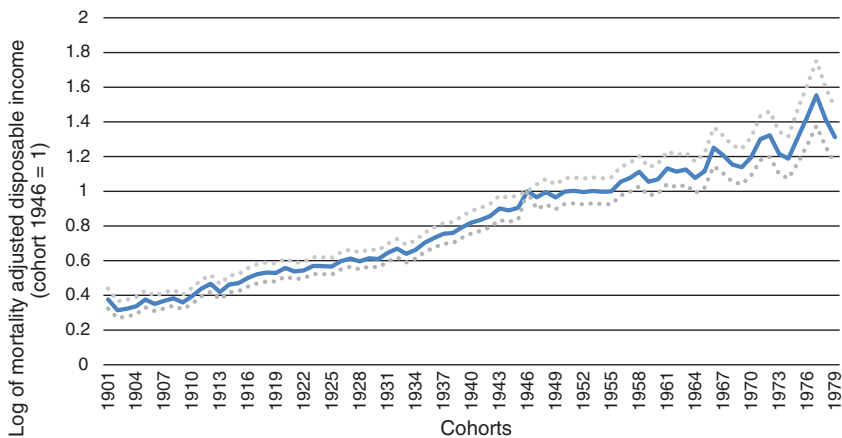
When we consider the whole population (Figure 4), we can discern two major periods in the development of disposable income by date of birth. Among the cohorts born before the Second World War, incomes increased significantly from generation to generation: from the 1926 cohort to the 1946 cohort, incomes rose 40%. But among the post-war cohorts, there were no significant changes. A slight increase can be observed for the latest cohorts. However, since there is less information on these cohorts in our databases, this finding should not be given too much importance. The observation that disposable income has stagnated suggests that the baby boom cohorts in particular have not had higher living standards

Figure 4(a):
Log of disposable income (values relative to cohort 1946) as a function of the date of birth, whole population



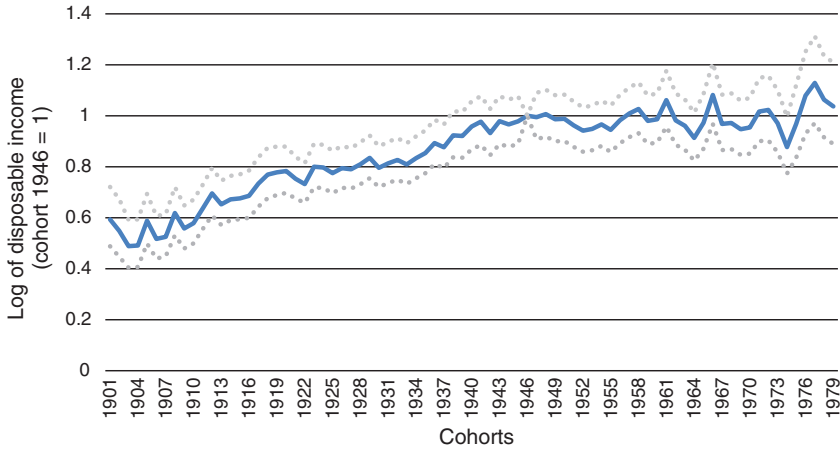
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 4(b):
Log of mortality adjusted disposable income (values relative to cohort 1946) as a function of the date of birth, whole population



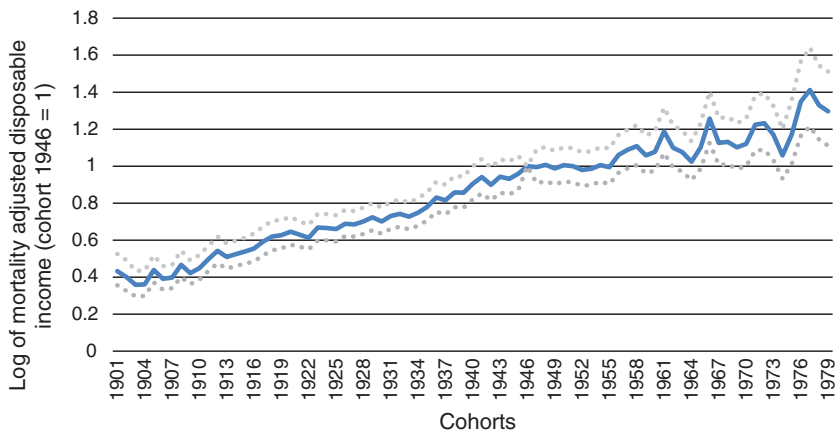
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 5(a):
Log of disposable income (values relative to cohort 1946) as a function of the date of birth, men



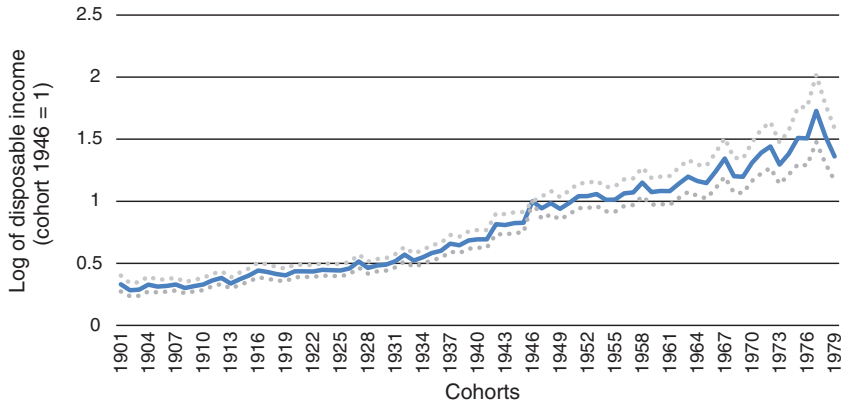
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 5(b):
Log of mortality adjusted disposable income (values relative to cohort 1946) as a function of the date of birth, men



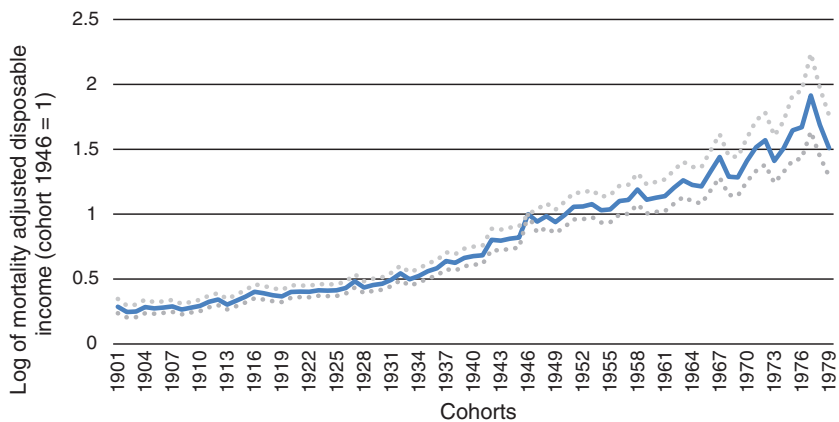
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 6(a):
Log of disposable income (values relative to cohort 1946) as a function of the date of birth, women



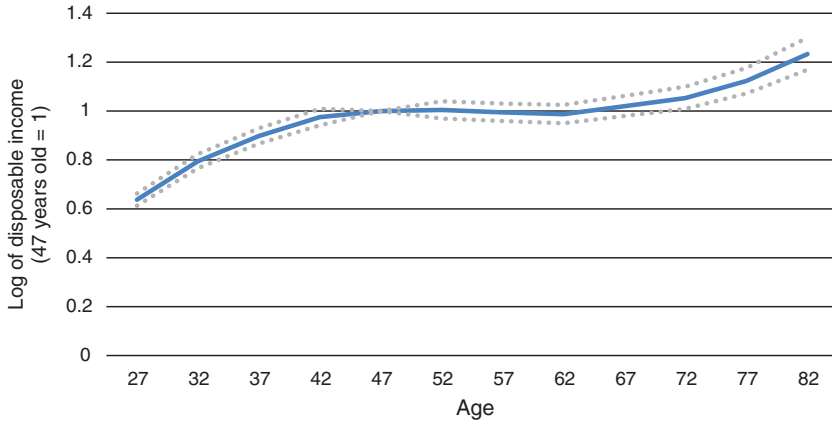
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 6(b):
Log of mortality adjusted disposable income (values relative to cohort 1946) as a function of the date of birth, women



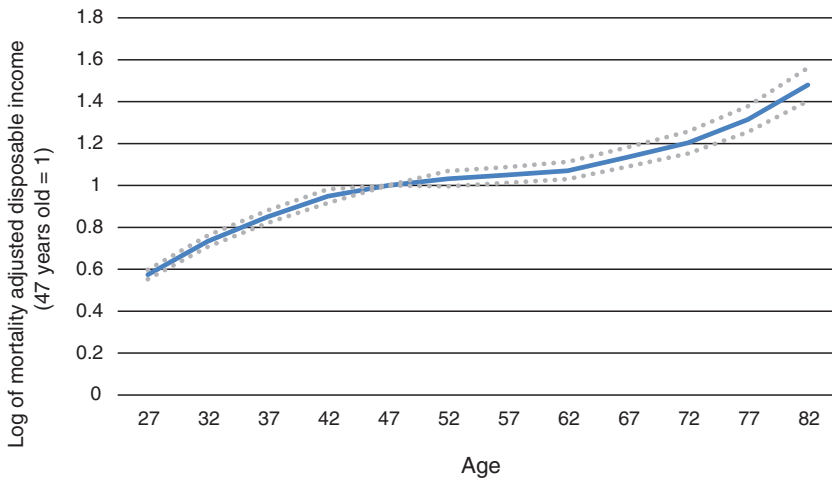
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure 7(a):
Log of disposable income (values relative to age 47) as a function of the age group, whole population



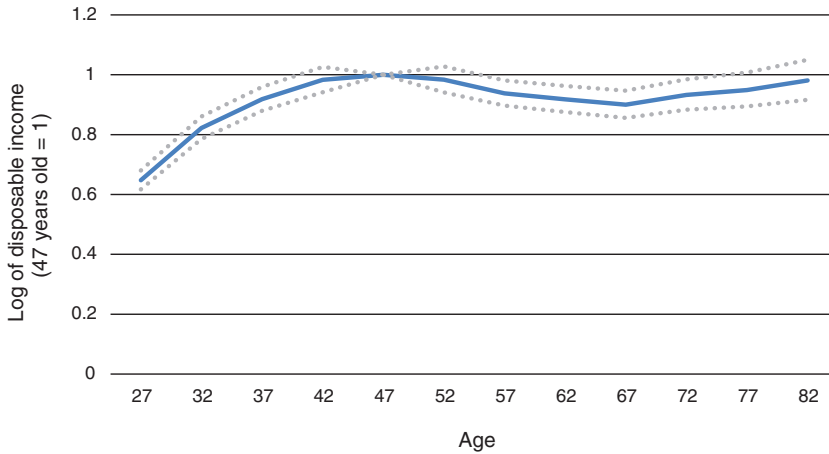
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure 7(b):
Log of mortality-adjusted disposable income (values relative to age 47) as a function of the age group, whole population



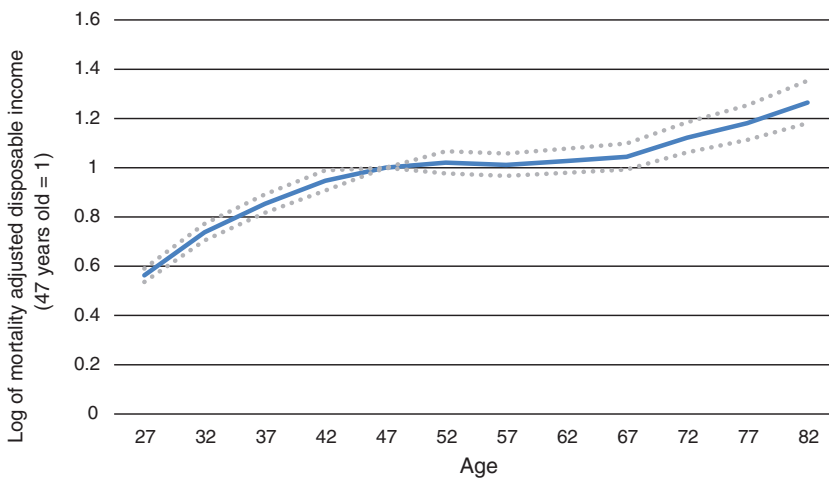
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure 8(a):
Log of disposable income (values relative to age 47) as a function of the age group, men



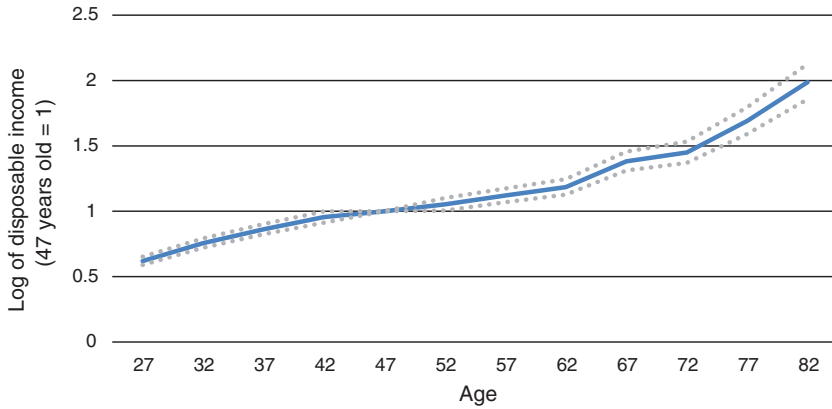
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure 8(b):
Log of mortality-adjusted disposable income (values relative to age 47) as a function of the age group, men



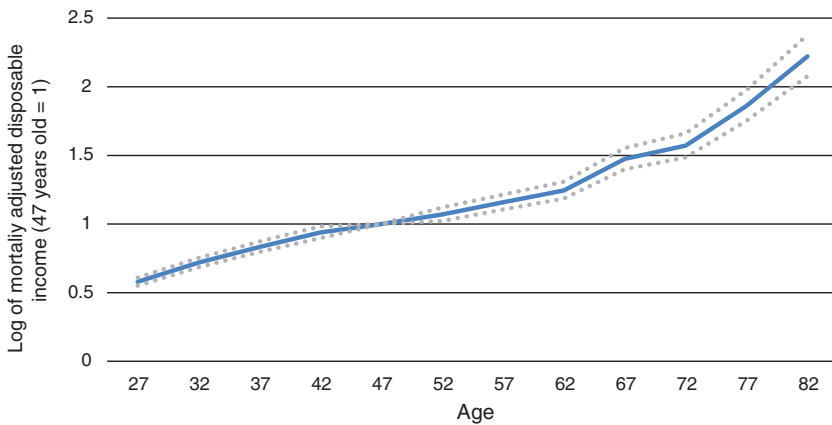
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure 9(a):
Log of disposable income (values relative to age 47) as a function of the age group, women



Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure 9(b):
Log of mortality-adjusted disposable income (values relative to age 47) as a function of the age group, women



Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

than subsequent cohorts (d'Albis and Badji 2017). When the gains from higher life expectancy are added, the distinction between these two periods becomes much less clear. Mortality-adjusted disposable income increased throughout the study period. In particular, we can see that all of the cohorts born after 1960 have enjoyed significantly higher incomes than the cohort born in 1946. We find, for example, that mortality-adjusted disposable income rose 28.6% from the 1946 cohort to the 1966 cohort, compared to 49.4% from the 1926 to the 1946 cohort. It thus appears that, ultimately, all of the post-baby boom cohorts had a higher adjusted income than the baby boomers. Note that our results are reinforced when using private consumption rather than disposable income (see Appendix B).

The breakdown by sex is also highly instructive. The variation in disposable income has been much flatter for the male population (Figure 5) than for the population as a whole. The increase observed among the pre-war cohorts is less pronounced, and no further relative improvement can be seen from the 1946 cohort to the 1970s cohorts. Including life expectancy gains hardly alters this observation, although we do find that the increase was greater for the pre-war cohorts, and that some post-baby boom cohorts had a significantly higher mortality-adjusted income than the 1946 cohort.

The results for the female population differ dramatically from those for the male population (Figure 6). Even before we include life expectancy gains, we see a considerable increase. For example, we find that disposable income for women rose 27% from the 1946 cohort to the 1966 cohort, compared to 71.9% from the 1926 cohort to the 1946 cohort. Furthermore, we can see that all of the cohorts born after 1961 had significantly higher incomes than the 1946 cohort. When life expectancy gains are included, these increases are slightly greater: i.e. mortality-adjusted disposable income for women rose 38.8% from the 1946 cohort to the 1966 cohort, and 76.6% from the 1926 cohort to the 1946 cohort.

It is of interest to note that recent studies of intergenerational mobility have focused on men alone. Lefranc (2018) has shown that the intergenerational persistence of income has increased starting with the cohorts born in the 1950s; while Alesina et al. (2018) has found that the French, like other Europeans, are pessimistic about intergenerational mobility. Our results suggest that the positions of men are not representative of the positions of the population as a whole; and, thus, that focusing on men's experiences conceals the improvements women have enjoyed. Moreover, as those two studies used data from the same survey (*Formation et Qualification Professionnelle*), which does not contain explicit information on income, the authors had to estimate income. Using the same survey to study intergenerational mobility through social classes, Vallet (2017) concluded that mobility increased for the younger cohorts, and that improvements were larger for women than for men; while Ben-Halima et al. (2014) showed that the degree of intergenerational persistence was less pronounced for daughters than for sons. The

findings of both of these studies complement our results, which highlight the role of education in the reduction in intergenerational inequalities.

3.2 Comparisons of incomes across age groups

Figures 7, 8, and 9 represent the logarithm of the two incomes we consider as functions of the age when we control for cohort and period effects. Figure 7 covers the whole population, whereas Figures 8 and 9 display the findings for men and women, respectively. In each figure, the left panel is the logarithm of the disposable income, and the right panel is the logarithm of the mortality-adjusted disposable income. The results are expressed as a deviation from a reference age group of 45–49-year-olds. As above, the grey lines delimit the confidence interval at the 5% level.

Looking at the population as a whole (Figure 7), we can see that disposable income by age increased sharply (+43.7%) from ages 27 to 47,² levelled out up to age 62, and then rose moderately (+27.9%) up to age 82. Note that this general increase in disposable income differs greatly from the pattern implied by the descriptive statistics in Figure 1(a). After controlling for cohort and period effects, the perceived dip in income after age 50 disappears, and indeed turns into an improvement. The rise in income after age 62 may be explained by a composition effect similar to the one described in the literature on the missing poor in the poverty statistics (Kanbur and Mukherjee 2007). Since longevity correlates with income, the proportion of low-income people tends to decline from one higher age group to the next.

When longevity gains are included, we find that income growth was continuous over a lifetime; and, indeed, rose later in life. Adjusted growth was 53% from ages 27 to 47, 7.3% from ages 47 to 62, and 50.1% from ages 62 to 82. Thus, we can see that the gains have been particularly large for the oldest people. These observations are in line with evidence indicating that since the late 1970s, life expectancy gains in France have occurred mainly at higher ages.

The breakdown of these results by sex uncovers wide disparities between men and women. Men's disposable income (Figure 8) stopped rising after age 52, and was even significantly lower from ages 57 to 77 than at age 47. By age 67, men's income had declined 9.5%. By contrast, women's disposable income (Figure 9) rose continuously, increasing 46.3% from ages 27 to 47, 20.3% from ages 47 to 62, and 123% from ages 62 to 82. Including longevity gains greatly alters the curve of men's income by age, which was significantly higher after age 67 than it was at age 47. Taking these gains into account also increases the slope of the curve of women's income.

² For ease of viewing, we have named each age group after its median. Thus, the 25–29 age group is named 27.

3.3 Discussion

A number of conclusions may be drawn from our estimates. The first is that there can be inequality between age groups without any generation losing out. None of the income by age curves presented in Section 3.2 slopes downwards: in most cases, the slopes rise, and a few level out (or fall slightly) during part of the life-cycle. This observation implies that, on average, a person of a given age has an income that is higher than or equal to that of a younger person, after controlling for cohort and period effects. But the finding that young people are less rich than current seniors does not mean that they lose out: in all of our estimates, their income was always found to be higher than or equal to that of members of previous generations at the same age. d'Albis and Badji (2017) attributed this pattern to economic growth. Although the growth in real per capita GDP was less vigorous between 1979 and 2010 than it was during the 30 years that followed the Second World War, it still increased 50% over this period.

Including longevity gains only supported this observation. After these gains were added, hardly any periods of stagnation in mortality-adjusted disposable income remained: in all of our models, that indicator rose as a function both of age and year of birth. This is likely because life expectancy at birth rose from 1979 to 2010 (10% to 40%, depending on age and sex), which added to the effect of economic growth. Thus, it is clear that well-being, which was measured here by combining an economic and a demographic indicator, improved both over a lifetime and from one generation to the next. If we assume that equity between generations is ensured as long as their well-being does not deteriorate (Stavins et al. 2003; Arrow et al. 2004), we can conclude that the relative positions of the French cohorts born from 1901 to 1979 have been equitable.

However, our breakdown of the population into men and women has led us to qualify this observation. It is clear that most of the gains in mortality-adjusted disposable income have gone to women, whose economic positions greatly improved over this period. Conversely, the mortality-adjusted disposable income levels of men varied little for all of the cohorts born after the Second World War. Thus, while men's well-being has not worsened, it has not improved as much as that of women. This point in no way detracts from the reality that men continue to have much higher disposable income than women (for example, among 52-year-olds in 2010, men's income levels were 60% higher than women's). Our observations merely reveal that women's earnings are catching up to those of men.

4 Concluding remarks

In this article, we examined the variation in well-being across the generations and across different ages in France. We constructed a composite indicator that assigns a monetary value to life expectancy gains in order to obtain mortality-adjusted disposable income. We showed that, generally speaking, this indicator has increased

from generation to generation. However, a breakdown by sex revealed that the position of women has improved considerably, while that of men has stagnated for all of the cohorts born after the Second World War. Over a life-cycle, this indicator has generally risen. From a public policy perspective, these results suggest that reducing the benefits of the elderly based on the assumption that they are advantaged relative to young people is not well grounded. Thus, reducing the living standards of baby boomers may not be equitable.

This research could be improved by including other dimensions of well-being. Leisure is obviously a major constituent of well-being (Jones and Klenow 2016). It is likely that the centuries-long reduction in working hours that has occurred across the developed countries (Boppart and Krusell 2016) has led to an increase in leisure time from one generation to the next. This would tend to support our basic conclusions that the well-being of generations has not declined, and that equity between the generations has been preserved. It would, however, be useful to examine how these developments have differed for men and women by taking into account the time spent on domestic production. This cannot be done with BdF survey data alone. Unfortunately, the main time use survey in France, the *Emploi du Temps*, covers a much shorter period (d'Albis et al. 2016). An additional avenue for future research would be income inequality. Here it would be useful to distinguish between general inequality and inequality by age, and to determine which of these forms of inequality has the greatest impact on individual well-being. Similarly, we may want to decompose our estimation by socio-economic status. These further questions are on our research agenda.

Acknowledgments

The authors thank two referees of this journal for their comments. Financial support from the Agence nationale de la recherche within the JPI MYBL framework (Award no. ANR-16-MYBL-0001-02) is gratefully acknowledged.

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Appendix A: Estimation results

We present our estimation results below. The explanatory variables are the age, the cohort, and the period, while the independent variable is the logarithm of the disposable income (Model M1) and the logarithm of the mortality-adjusted disposable income (Model M2). Data sources are the authors' own calculations using waves 1979, 1984, 1989, 1995, 2000, 2005, and 2010 of the French Household Expenditure survey (*enquêtes Budget de famille*) from the Insee. In all tables, standard errors are in parentheses, and significance is denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Age effects						
25–29	–0.45*** (0.020)	–0.55*** (0.020)	–0.48*** (0.026)	–0.55*** (0.026)	–0.43*** (0.025)	–0.57*** (0.025)
30–34	–0.23*** (0.019)	–0.31*** (0.019)	–0.28*** (0.024)	–0.33*** (0.024)	–0.20*** (0.023)	–0.30*** (0.023)
35–39	–0.11*** (0.018)	–0.16*** (0.018)	–0.15*** (0.023)	–0.18*** (0.023)	–0.08*** (0.022)	–0.16*** (0.022)
40–44	–0.03 (0.018)	–0.05*** (0.018)	–0.05** (0.023)	–0.06*** (0.023)	–0.02 (0.022)	–0.05** (0.022)
45–49	Ref	Ref	Ref	Ref	Ref	Ref
50–54	0.00 (0.018)	0.03* (0.018)	0.05** (0.023)	0.07*** (0.023)	–0.02 (0.022)	0.02 (0.022)
55–59	–0.01 (0.018)	0.05*** (0.018)	0.11*** (0.024)	0.15*** (0.024)	–0.06*** (0.023)	0.01 (0.023)
60–64	–0.01 (0.019)	0.07*** (0.020)	0.17*** (0.025)	0.22*** (0.025)	–0.09*** (0.024)	0.03 (0.024)
65–69	0.02 (0.020)	0.13*** (0.021)	0.32*** (0.026)	0.39*** (0.026)	–0.11*** (0.026)	0.04* (0.026)
70–74	0.05** (0.022)	0.19*** (0.022)	0.37*** (0.028)	0.45*** (0.028)	–0.07** (0.028)	0.12*** (0.028)
75–79	0.12*** (0.024)	0.27*** (0.024)	0.53*** (0.031)	0.62*** (0.031)	–0.05* (0.030)	0.17*** (0.030)
80–84	0.21*** (0.027)	0.39*** (0.027)	0.69*** (0.034)	0.80*** (0.034)	–0.02 (0.035)	0.23*** (0.035)
Observations	407	407	407	407	407	407
R-squared	0.90	0.92	0.91	0.92	0.81	0.87
Cohorts effects						
1901	–0.75*** (0.077)	–0.98*** (0.078)	–1.11*** (0.098)	–1.25*** (0.098)	–0.52*** (0.099)	–0.84*** (0.099)
1902	–0.94*** (0.076)	–1.16*** (0.077)	–1.26*** (0.094)	–1.40*** (0.094)	–0.60*** (0.104)	–0.91*** (0.105)
1903	–0.91*** (0.076)	–1.13*** (0.077)	–1.25*** (0.097)	–1.39*** (0.097)	–0.72*** (0.097)	–1.02*** (0.097)
1904	–0.86*** (0.074)	–1.09*** (0.074)	–1.11*** (0.093)	–1.26*** (0.093)	–0.71*** (0.096)	–1.02*** (0.096)
1905	–0.77*** (0.065)	–0.98*** (0.065)	–1.16*** (0.082)	–1.30*** (0.082)	–0.53*** (0.084)	–0.82*** (0.084)

Continued

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Cohorts effects						
1906	-0.85*** (0.063)	-1.05*** (0.063)	-1.15*** (0.079)	-1.27*** (0.079)	-0.66*** (0.082)	-0.94*** (0.082)
1907	-0.80*** (0.063)	-1.00*** (0.063)	-1.11*** (0.080)	-1.24*** (0.080)	-0.64*** (0.079)	-0.92*** (0.080)
1908	-0.76*** (0.061)	-0.96*** (0.061)	-1.20*** (0.077)	-1.33*** (0.077)	-0.48*** (0.078)	-0.76*** (0.078)
1909	-0.82*** (0.058)	-1.02*** (0.059)	-1.15*** (0.073)	-1.28*** (0.073)	-0.58*** (0.077)	-0.86*** (0.077)
1910	-0.75*** (0.059)	-0.93*** (0.060)	-1.11*** (0.076)	-1.23*** (0.076)	-0.55*** (0.075)	-0.80*** (0.075)
1911	-0.65*** (0.055)	-0.82*** (0.055)	-1.02*** (0.070)	-1.12*** (0.070)	-0.45*** (0.069)	-0.70*** (0.069)
1912	-0.58*** (0.053)	-0.76*** (0.054)	-0.96*** (0.068)	-1.07*** (0.068)	-0.36*** (0.068)	-0.61*** (0.068)
1913	-0.69*** (0.052)	-0.87*** (0.053)	-1.09*** (0.067)	-1.19*** (0.067)	-0.43*** (0.067)	-0.67*** (0.067)
1914	-0.59*** (0.053)	-0.77*** (0.053)	-0.99*** (0.068)	-1.10*** (0.068)	-0.40*** (0.066)	-0.64*** (0.066)
1915	-0.59*** (0.052)	-0.75*** (0.052)	-0.91*** (0.066)	-1.01*** (0.066)	-0.39*** (0.066)	-0.62*** (0.066)
1916	-0.54*** (0.054)	-0.69*** (0.054)	-0.82*** (0.068)	-0.91*** (0.068)	-0.38*** (0.069)	-0.59*** (0.069)
1917	-0.50*** (0.053)	-0.65*** (0.053)	-0.84*** (0.069)	-0.94*** (0.069)	-0.31*** (0.067)	-0.52*** (0.067)
1918	-0.48*** (0.052)	-0.63*** (0.052)	-0.88*** (0.067)	-0.98*** (0.067)	-0.26*** (0.065)	-0.48*** (0.065)
1919	-0.48*** (0.049)	-0.64*** (0.050)	-0.91*** (0.064)	-1.00*** (0.064)	-0.25*** (0.062)	-0.47*** (0.062)
1920	-0.44*** (0.047)	-0.58*** (0.047)	-0.83*** (0.060)	-0.91*** (0.060)	-0.24*** (0.059)	-0.44*** (0.059)
1921	-0.49*** (0.044)	-0.62*** (0.044)	-0.83*** (0.056)	-0.91*** (0.056)	-0.28*** (0.055)	-0.46*** (0.055)
1922	-0.48*** (0.043)	-0.61*** (0.043)	-0.83*** (0.056)	-0.91*** (0.056)	-0.31*** (0.054)	-0.49*** (0.054)
1923	-0.43*** (0.043)	-0.56*** (0.043)	-0.80*** (0.056)	-0.88*** (0.056)	-0.22*** (0.054)	-0.40*** (0.054)
1924	-0.43*** (0.043)	-0.56*** (0.043)	-0.81*** (0.056)	-0.89*** (0.056)	-0.23*** (0.054)	-0.41*** (0.054)

Continued

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Cohorts effects						
1925	-0.45*** (0.043)	-0.57*** (0.043)	-0.82*** (0.056)	-0.88*** (0.056)	-0.25*** (0.054)	-0.42*** (0.055)
1926	-0.41*** (0.042)	-0.51*** (0.042)	-0.78*** (0.054)	-0.84*** (0.054)	-0.23*** (0.052)	-0.37*** (0.052)
1927	-0.39*** (0.041)	-0.49*** (0.041)	-0.66*** (0.053)	-0.73*** (0.053)	-0.24*** (0.051)	-0.38*** (0.051)
1928	-0.41*** (0.041)	-0.52*** (0.041)	-0.77*** (0.053)	-0.83*** (0.053)	-0.21*** (0.051)	-0.35*** (0.052)
1929	-0.39*** (0.041)	-0.49*** (0.041)	-0.73*** (0.053)	-0.79*** (0.053)	-0.18*** (0.051)	-0.32*** (0.051)
1930	-0.41*** (0.041)	-0.50*** (0.041)	-0.71*** (0.053)	-0.77*** (0.053)	-0.23*** (0.051)	-0.35*** (0.051)
1931	-0.36*** (0.040)	-0.44*** (0.040)	-0.66*** (0.052)	-0.70*** (0.052)	-0.21*** (0.050)	-0.31*** (0.050)
1932	-0.32*** (0.040)	-0.40*** (0.040)	-0.56*** (0.052)	-0.61*** (0.052)	-0.19*** (0.050)	-0.30*** (0.050)
1933	-0.37*** (0.040)	-0.45*** (0.040)	-0.65*** (0.052)	-0.70*** (0.052)	-0.21*** (0.050)	-0.32*** (0.050)
1934	-0.33*** (0.040)	-0.41*** (0.040)	-0.60*** (0.052)	-0.65*** (0.052)	-0.18*** (0.050)	-0.29*** (0.050)
1935	-0.28*** (0.040)	-0.35*** (0.040)	-0.54*** (0.052)	-0.58*** (0.052)	-0.16*** (0.050)	-0.25*** (0.050)
1936	-0.26*** (0.040)	-0.31*** (0.040)	-0.51*** (0.052)	-0.54*** (0.052)	-0.11** (0.050)	-0.19*** (0.050)
1937	-0.23*** (0.040)	-0.28*** (0.040)	-0.42*** (0.052)	-0.45*** (0.052)	-0.13*** (0.050)	-0.20*** (0.050)
1938	-0.22*** (0.040)	-0.27*** (0.040)	-0.44*** (0.052)	-0.47*** (0.052)	-0.08 (0.050)	-0.15*** (0.050)
1939	-0.18*** (0.040)	-0.23*** (0.040)	-0.38*** (0.052)	-0.41*** (0.052)	-0.08* (0.049)	-0.16*** (0.050)
1940	-0.16*** (0.040)	-0.20*** (0.040)	-0.37*** (0.052)	-0.39*** (0.052)	-0.04 (0.050)	-0.10** (0.050)
1941	-0.15*** (0.040)	-0.18*** (0.040)	-0.37*** (0.052)	-0.38*** (0.052)	-0.02 (0.050)	-0.06 (0.050)
1942	-0.13*** (0.040)	-0.15*** (0.040)	-0.21*** (0.052)	-0.22*** (0.052)	-0.07 (0.050)	-0.11** (0.050)
1943	-0.08** (0.039)	-0.10*** (0.040)	-0.21*** (0.052)	-0.23*** (0.052)	-0.02 (0.049)	-0.06 (0.049)

Continued

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Cohorts effects						
1944	-0.09** (0.039)	-0.12*** (0.039)	-0.19*** (0.051)	-0.21*** (0.051)	-0.03 (0.048)	-0.07 (0.049)
1945	-0.09** (0.039)	-0.10** (0.039)	-0.19*** (0.051)	-0.20*** (0.051)	-0.02 (0.049)	-0.04 (0.049)
1946	Ref	Ref	Ref	Ref	Ref	Ref
1947	-0.04 (0.037)	-0.03 (0.038)	-0.06 (0.049)	-0.06 (0.049)	-0.01 (0.046)	-0.01 (0.046)
1948	-0.01 (0.037)	-0.00 (0.038)	-0.02 (0.049)	-0.02 (0.049)	0.01 (0.046)	0.01 (0.046)
1949	-0.04 (0.037)	-0.04 (0.038)	-0.06 (0.049)	-0.06 (0.049)	-0.01 (0.046)	-0.01 (0.047)
1950	-0.01 (0.038)	-0.00 (0.038)	-0.01 (0.049)	-0.01 (0.049)	-0.01 (0.047)	0.01 (0.047)
1951	-0.03 (0.038)	0.00 (0.038)	0.04 (0.049)	0.06 (0.049)	-0.04 (0.047)	0.00 (0.047)
1952	-0.03 (0.038)	-0.00 (0.038)	0.04 (0.049)	0.06 (0.049)	-0.06 (0.047)	-0.02 (0.047)
1953	-0.03 (0.038)	0.00 (0.038)	0.06 (0.049)	0.07 (0.049)	-0.05 (0.047)	-0.01 (0.047)
1954	-0.03 (0.037)	-0.00 (0.038)	0.01 (0.049)	0.03 (0.049)	-0.03 (0.047)	0.01 (0.047)
1955	-0.04 (0.039)	-0.00 (0.040)	0.01 (0.051)	0.04 (0.051)	-0.06 (0.049)	-0.01 (0.049)
1956	-0.00 (0.039)	0.05 (0.039)	0.06 (0.051)	0.10* (0.051)	-0.02 (0.049)	0.06 (0.049)
1957	0.02 (0.039)	0.07* (0.039)	0.07 (0.051)	0.10** (0.051)	0.01 (0.049)	0.08* (0.049)
1958	0.05 (0.039)	0.11*** (0.040)	0.14*** (0.051)	0.17*** (0.051)	0.03 (0.049)	0.10** (0.049)
1959	-0.00 (0.039)	0.05 (0.039)	0.07 (0.051)	0.11** (0.051)	-0.02 (0.049)	0.06 (0.049)
1960	0.00 (0.040)	0.07* (0.040)	0.08 (0.052)	0.12** (0.052)	-0.01 (0.050)	0.08 (0.050)
1961	0.04 (0.042)	0.12*** (0.042)	0.08 (0.054)	0.13** (0.054)	0.06 (0.052)	0.17*** (0.053)
1962	0.02 (0.042)	0.11** (0.042)	0.13** (0.054)	0.19*** (0.054)	-0.02 (0.052)	0.09* (0.052)

Continued

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Cohorts effects						
1963	0.04 (0.042)	0.12*** (0.042)	0.18*** (0.055)	0.23*** (0.055)	-0.04 (0.052)	0.07 (0.052)
1964	-0.01 (0.042)	0.07* (0.042)	0.15*** (0.055)	0.20*** (0.055)	-0.09* (0.052)	0.02 (0.052)
1965	0.02 (0.045)	0.11** (0.045)	0.14** (0.058)	0.19*** (0.058)	-0.03 (0.056)	0.10* (0.056)
1966	0.11** (0.045)	0.22*** (0.045)	0.21*** (0.059)	0.28*** (0.059)	0.08 (0.056)	0.23*** (0.056)
1967	0.08* (0.045)	0.19*** (0.046)	0.30*** (0.059)	0.36*** (0.059)	-0.03 (0.057)	0.12** (0.057)
1968	0.03 (0.046)	0.14*** (0.046)	0.18*** (0.059)	0.25*** (0.059)	-0.03 (0.057)	0.12** (0.057)
1969	0.02 (0.045)	0.13*** (0.046)	0.18*** (0.059)	0.25*** (0.059)	-0.05 (0.057)	0.10* (0.057)
1970	0.06 (0.046)	0.18*** (0.047)	0.27*** (0.060)	0.34*** (0.060)	-0.05 (0.058)	0.11* (0.058)
1971	0.13** (0.050)	0.26*** (0.050)	0.33*** (0.065)	0.42*** (0.065)	0.02 (0.062)	0.20*** (0.062)
1972	0.14*** (0.050)	0.28*** (0.050)	0.37*** (0.065)	0.45*** (0.065)	0.02 (0.063)	0.21*** (0.063)
1973	0.06 (0.051)	0.20*** (0.051)	0.26*** (0.065)	0.34*** (0.065)	-0.03 (0.064)	0.16** (0.064)
1974	0.04 (0.051)	0.17*** (0.051)	0.32*** (0.066)	0.41*** (0.066)	-0.13** (0.064)	0.06 (0.064)
1975	0.13** (0.060)	0.27*** (0.060)	0.41*** (0.077)	0.50*** (0.078)	-0.03 (0.074)	0.16** (0.075)
1976	0.19*** (0.061)	0.35*** (0.061)	0.41*** (0.079)	0.51*** (0.079)	0.08 (0.075)	0.30*** (0.076)
1977	0.28*** (0.061)	0.44*** (0.062)	0.55*** (0.079)	0.65*** (0.079)	0.12 (0.076)	0.34*** (0.077)
1978	0.18*** (0.061)	0.35*** (0.061)	0.42*** (0.079)	0.52*** (0.079)	0.06 (0.076)	0.28*** (0.076)
1979	0.11* (0.061)	0.27*** (0.062)	0.31*** (0.079)	0.41*** (0.079)	0.04 (0.078)	0.26*** (0.078)
Constant	10.29*** (0.029)	10.21*** (0.030)	9.98*** (0.038)	9.93*** (0.038)	10.50*** (0.037)	10.39*** (0.037)
Observations	407	407	407	407	407	407
R-squared	0.90	0.92	0.91	0.92	0.81	0.87

Continued

Variables	Whole population		Women		Men	
	M1	M2	M1	M2	M1	M2
Period effects						
1979	Omm	Omm	Omm	Omm	Omm	Omm
1984	Omm	Omm	Omm	Omm	Omm	Omm
1989	-0.01 (0.009)	-0.01 (0.009)	0.06*** (0.012)	0.06*** (0.012)	-0.05*** (0.012)	-0.05*** (0.012)
1995	-0.03*** (0.009)	-0.03*** (0.010)	-0.02 (0.012)	-0.02 (0.012)	-0.02 (0.012)	-0.03** (0.012)
2000	-0.00 (0.009)	0.00 (0.009)	0.02* (0.012)	0.03** (0.012)	-0.02 (0.011)	-0.01 (0.011)
2005	0.06*** (0.009)	0.06*** (0.009)	0.05*** (0.011)	0.05*** (0.011)	0.06*** (0.011)	0.07*** (0.011)
2010	-0.02*** (0.008)	-0.03*** (0.008)	-0.07*** (0.010)	-0.07*** (0.010)	-0.01 (0.010)	-0.01 (0.010)
Observations	407	407	407	407	407	407
R-squared	0.90	0.92	0.91	0.92	0.81	0.87

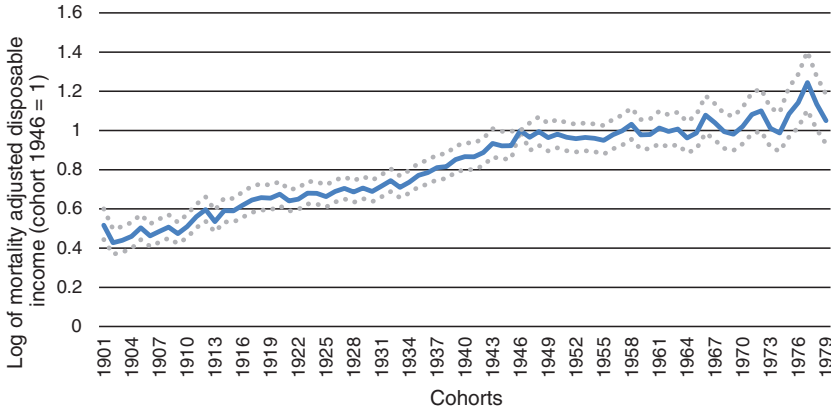
Appendix B: Robustness exercises

We have rerun our estimations of Model M2 (mortality-adjusted disposable income for the whole population) for an alternative set of parameters of the utility function: $\gamma = 0.5$, and $\alpha = 0$, which are still consistent with the value of the statistical life provided by Murphy and Topel (2003). Although those parameters may appear to be more “realistic”, they lead to unpleasant findings, as the computed willingness to pay appears to be negative at all ages and dates. Put differently, those parameters are associated with a willingness to be paid in exchange for enjoying a long lifespan, which is clearly “unrealistic”.

Figures B.1 and B.2 are the counterparts of Figures 4(b) and 7(b), estimated with the new parameters. We see that the profiles are still increasing but are much flatter, which is explained by the fact that the increase in life expectancy translates into a lower adjusted income.

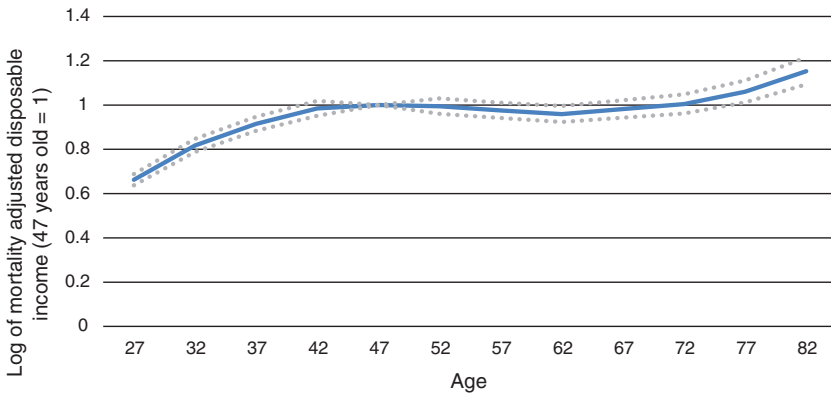
Another robustness check can be provided by using the consumption data (see d'Albis and Badji 2017 for details) rather than disposable income. Figures B.3 and B.4 are the counterparts of Figures 4(a) and 4(b). The slopes of the profiles are steeper than those obtained with income, but the profiles are qualitatively the same.

Figure B.1:
Log of mortality adjusted disposable income (values relative to cohort 1946) as a function of the date of birth, whole population, for alternative parameters of the utility function



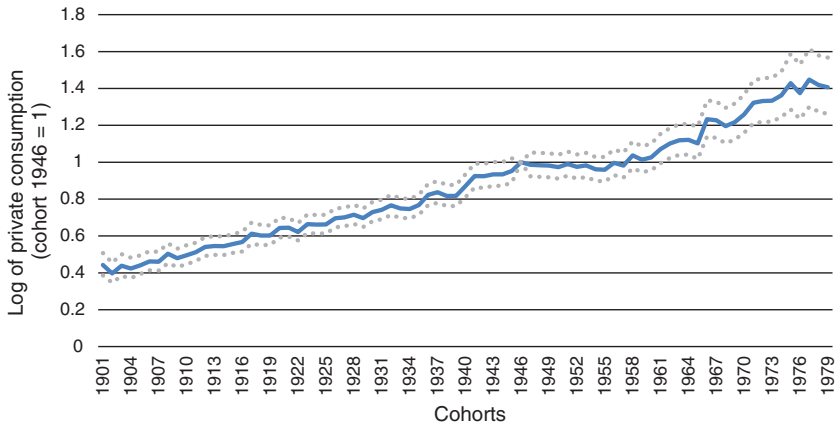
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period

Figure B.2:
Log of mortality adjusted disposable income (values relative to age 47) as a function of the age group, whole population, for alternative parameters of the utility function



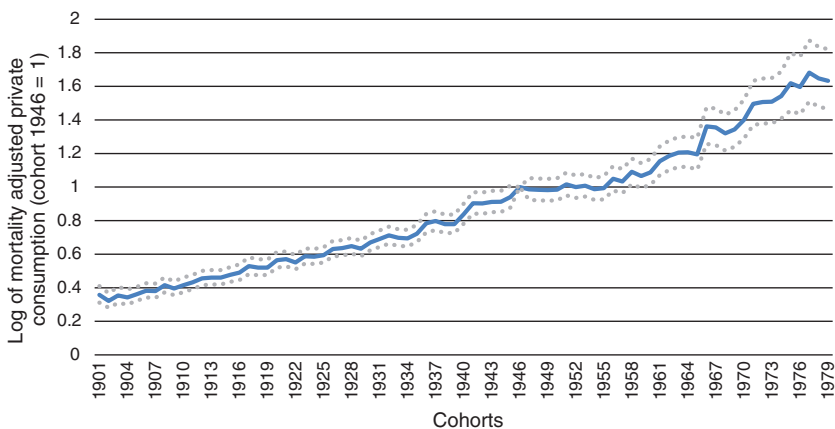
Note: The dotted curves show the confidence intervals at 95%. Model controlled for the date of birth and the period.

Figure B.3:
Log of private consumption (values relative to cohort 1946) as a function of the date of birth, whole population



Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.

Figure B.4:
Log of mortality adjusted private consumption (values relative to cohort 1946) as a function of the date of birth, whole population



Note: The dotted curves show the confidence intervals at 95%. Model controlled for the age group and the period.