Intergenerational Equity by Educational Attainments in France[1]

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Abstract: This article analyzes the development of inequalities across the lifespan and generations in France using a pseudo-panel developed from successive waves of the French Household Expenditure Survey that took place between 1979 and 2011. The standard of living of individuals, evaluated using individualized disposable income or private consumption, including housing costs, is decomposed by sex and educational attainment. Our Age-Period-Cohort models reveal that men with lower education levels who were born after 1950 experienced a significant decline in disposable income compared to those born between 1918 and 1950. Conversely, we observe no decline in disposable income when the whole population of men is considered. The evolution is rather different for women: those with lower education levels did not experience any decline, whereas the overall population of women benefitted from a strong increase in disposable income across generations.

Keywords: Intergenerational Equity; Age-Period-Cohort models; Education.

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Introduction

France's age dependency ratio has continuously increased since the mid 1980's. The ratio of dependents (people younger than 15 or older than 64) to the working-age population (those ages 15-64), is now above 60%, versus 50% in 1986. This demographic shift is often seen as a potential threat for intergenerational equity, as those born after the Second World War require large inflows of public transfers to finance their pensions and health care. In d'Albis and Badji (2017), we nevertheless showed that there was no decline in standard of living across generations in France and, in particular, that the baby-boom cohorts did not enjoy a more favorable position than the cohorts that followed them. In this article, we continue the analysis of intergenerational inequalities in France by adding two important dimensions. The first is gender, to capture the effect of the strong increase in women's labor market participation since the Second World War. The second is education, which also tremendously increased across cohorts over the period.

Intergenerational equity is not a simple concept to evaluate mainly because it is complicated to define. Parity across cohorts might not be desirable, as most people would be happy to see their children with better standard of living. Therefore, a general increase of the standards of living across generations, which is actually an intergenerational inequality, might be considered fair. This induces asymmetry into the comparisons of a generation with the preceding and the following ones. In a nutshell, there is a consensus to say that equity between generations is ensured as long as their standard of living does not deteriorate (Stavins et al. 2003, Arrow et al. 2004). This analysis across generations translates into investigation over the lifespan. A decline in consumption over the life-cycle is often perceived as non-desirable. Regardless of age and present income, one should be able to allocate resources to ensure non-declining consumption. In the analysis we present below, we therefore focus our attention on

whether standards of living are declining for younger generations and over the life-cycle.

Technical difficulties also arise when evaluating intergenerational equity. One would ideally measure "wellbeing", which is complicated as it is surely a composite variable that includes subjective measures. Economists then tend to use consumption as a proxy, whereas national statistical institutes commonly use disposable income as it is better measured in surveys. In this article, we use both of them and consider them as measures of the standard of living. Another technical difficulty hinges on the fact that, ideally, one would have access to panel data following individuals of different generations over their life-cycle. But for most countries, including France, such panels do not exist. We therefore use the seven editions of the French Household Expenditure survey, carried out between 1979 and 2010, which we rework to develop a pseudo-panel to follow different cohorts throughout their lifecycle. This gives us 407 cohort observations, comprising an average of 288 individuals.

The main novelty of our study is to assess the role of educational attainment in intergenerational equity. The size of our dataset allows us to provide a rough assessment of educational attainment by identifying individuals who have not gone beyond secondary education. In the French educational system, at the end of the secondary system, students pass a national exam, named the *Baccalauréat*, which permits them to obtain a diploma that generally gives access to university studies. The share of *Baccalauréat* graduates within cohorts has skyrocketed from around 10% in the 1960's to nearly 80% today. It reveals a tremendous increase in the access to higher education in France, which translates to a higher proportion of university students (Duru-Bellat and Kieffer 2008). Using *Baccalauréat* attainment as an indicator of educational qualifications in France is imperfect —like any indicator. In particular, the creation of a vocational *Baccalauréat*, whose graduates have lower chances than others to complete tertiary education, soften the picture. Nevertheless, the share of

persons who accessed tertiary education and got a university diploma increased over the period.[4] And by comparing *Baccalauréat* attainment across cohorts, we are thus able to control for an increase in qualifications. This is also meaningful as intergenerational comparisons may implicitly assume a stable qualification structure: non-educated sons may compare themselves with their non-educated fathers, while higher education levels improve the standard of living across generations.

Using an Age-Period-Cohort model and the identification strategy of Deaton and Paxson (1994), we show that women's position has considerably improved while men's has stagnated for all cohorts born after the Second World War. When we restrict to the population without a *Baccalauréat*, men who were born after 1950 experienced a significant decline in disposable income compared to those born between 1918 and 1950. Conversely, women without a *Baccalauréat* did not experience such a decline. We conclude that despite economic growth, equity across generations of less educated men was not achieved for cohorts born after 1950 and that cohorts born between 1918 and 1950 were relatively favored. We moreover show that the relative economic position (as measured by disposable incomes) of men generally decreased from one generation to another, and that the decline is particularly strong for men without a *Baccalauréat*.

This article is in the continuation of a broader project to develop a French database, the National Transfer Accounts (NTA, hereafter). The ambition of the NTA is to measure all public and private transfers between ages and generations by providing a breakdown of all relevant variables of the National Accounts by age, and possibly by gender and education. In France, the life-cycle deficit (i.e. the difference between labor income and consumption) was presented in d'Albis et al. (2015). More recently, d'Albis et al. (2019) showed that over the period 1979-2011, the share of the elderly's

[4] As an illustration, Duru-Bellat and Kieffer (2008) computed that the percentage of access to tertiary education rose from 27.7% for the 1962-1967 cohorts to 53.2% for the 1975-1980 cohorts.

consumption financed by the State declined. Over this period, the elderly have increasingly relied on themselves to finance their consumption whereas the youth increasingly relied on the State and their family to finance their own consumption. These results suggest that the major demographic shift in France during this period did not come at the expense of the youth. This analysis however relies on repeated cross sectional observations and the life cycle dimension is not taken into account. In d'Albis and Badji (2017) and in the present article, we are using the same data sources in order to provide a complete comparison of the standard of living across ages and generations using Age-Period-Cohort models. This analysis is better suited to determine whether intergenerational equity deteriorated over the last 40 years.

The rest of the paper is organized as follows. Section 2 presents the data, the main variables we consider, and the statistical strategy based on Age-Period-Cohort models. Section 3 presents our results, discussing the evolution of standard of living across age groups and across cohorts. Section 4 concludes.

2 Data, Descriptive Statistics and Estimation Strategy

2.1 Standards of Living in French Expenditure Surveys

We use the French Household Expenditure surveys (*Budget de famille*, referred to hereafter as BdF) conducted in 1979, 1984, 1989, 1995, 2000, 2005 and 2010 by the French Statistical Institute, INSEE. These surveys were carried out among 10,000 households with the aim of reconstituting all household accounts by gathering information on their income and expenditure. It is worth noting that, in the survey, a household refers to a group of people who ordinarily share a dwelling and have a shared budget.

Standard of living is represented by two main variables. First, disposable income -- defined as the income after deduction of taxes and social security contributions-- is used. 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 pensions and unemployment benefits; (iv) current transfers, particularly insurance indemnities minus premiums and transfers between households. As a robustness check, we also compute the disposable income excluding imputed rent (as they are not directly observed in the first waves of the surveys). Second, we use private consumption at the individual level. This is the sum of the twelve consumption items in the Classification of Individual Consumption by Purpose. It excludes taxes, major maintenance work and loan repayments, but includes imputed rent. As a robustness check, we also use a modified private consumption that is computed without any expenditures related to housing (such as rents, imputed rents, etc.). Note that the 1979 to 1995 surveys do not provide figures for imputed rents, which were thus estimated using the characteristics of housing as in d'Albis et Badji (2017).

In the BdF surveys, consumption is declared at the household level. Diverging from d'Albis and Badji (2017), we individualize the variables and split them among the household members using the NTA rule, which gives a weighting that worth 0.4 to any individual under age 4 and that linearly increases with age until age 20 where it reaches 1. The BdF surveys provide some incomes at the household level (such as property incomes, imputed rents, family benefits, transfers between households direct taxes paid) and others at individual level. We individualize the variables as follows[5]. Property income, transfers between households, direct taxes, and family benefits are allocated equally between the household head and his or her spouse. Imputed rents are allocated using the NTA rule. We have chosen to treat differently imputed rents from

[5] Note that we do not follow the recommendations made by the NTA (United Nations 2013), which suggest to allocate property incomes to the household head only. Since such an allocation would bias our results by gender, we have chosen a more realistic one.

other property incomes as children directly benefit from living in housing owned by their parents. This assumption has no consequence on our main qualitative results as our estimates are done for variables computed with and without imputed rents.

To compare data within a consistent time frame, we adjust survey data to the French System of National Accounts aggregates. This adjustment is similar to the one carried out for the NTA (d'Albis et al. 2015) and aims to equalize the total disposable income of individuals with National Accounts aggregates. Before adjustment, we corrected differences in coverage and concept between the BdF survey and National Accounts as much as possible. The main difference stems from the under-declaration or non-declaration of some consumption and income in surveys. For instance, the BdF survey only collects the income and consumption of individuals residing in France in ordinary households (i.e. excluding households residing in mobile or communal dwellings), whereas the National income considers all households. In addition, the BdF survey covers the consumption of French residents abroad, but does not include the consumption of foreign tourists in France. Finally, we deflated all variables using the consumer price index provided by INSEE.

The rescaled individual variables are then split by sex and educational attainment. Educational attainment is delineated by whether or not one has received a *Baccalauréat*, the national diploma allowing students to pursue university studies. This categorization is relevant in the French context as persons without a *Baccalauréat* face a higher risk of unemployment, poorer working conditions, and weaker remunerations.

First, according to the recent literature (Amossé and Chardon 2006, Jauneau 2009, Le Rhun and Pollet 2011), access to the labor market depends strongly on educational attainment. For example, in 2010, unemployment one to four years after the completion of studies was 11% for university graduates, 23% for those who have only

a *Baccalauréat,* and 44% for those without any diploma. After five years, difficulties remain for the latter as their unemployment rate ranges between 20 and 30%.

Moreover, Le Rhun and Pollet (2011) show that the situation for those without a *Baccalauréat* has deteriorated since the late 1970's. Between 1979 and 1985, their unemployment rate doubled from 21% to 42%. The rate then fell until 1989 when it stabilized to about 30% for three years. After 1992, the unemployment rate increased again and reached 45% in 1999. In comparison, from 1979 to 1999 the employment rate of the whole population increased by 5 percentage points. During economic crisis, such as in 2008-2009, the less qualified are further impacted by economic downturn, as their work contracts are more precarious and recent college graduates accept jobs for which they are overqualified.

Concerning working conditions, it has been shown that persons without a *Baccalauréat* enjoy less stability as they are more likely to accept short term employment contracts and part-time jobs. According to Jauneau (2009), in 2007, 23% of employees without a *Baccalauréat* held short-term contracts versus 14% for the whole population of employees. Moreover, the share of part-time jobs is 32% for those without a *Baccalauréat* against 18% for those with the degree. They are also more likely to be under-employed, meaning that they would like to work more. Even controlling for age and sex, under-employment is higher for persons without a *Baccalauréat*.

The wage gap between employees with and without a *Baccalauréat* was rather stable from 1996 to 2002 and amounted to 35% (Amossé and Chardon 2007). Once controlled for age, sex and part-time work, Jauneau (2009) estimates that the gap between employees lacking a *Baccalauréat* and the rest of employees reached 44% in 2006. This partly translates to the gap in disposable income between the two groups, which was estimated as 25% in 2006. The variance in these two gaps can be explained by France's socio-fiscal system.

2.2 A Pseudo Panel

In order to dissociate the effects of age, cohort and period, individual data can be used provided that one has panel data that follow individuals throughout their entire lifecycle. Since our data are cross-sectional, it is necessary to build pseudo-panels that group individuals belonging to the same cohort. Otherwise, the estimates could be biased (Deaton 1985, Guillerm 2017). We defined our cohorts using the "date of birth" variable, and thereby constituted 79 annual cohorts: the first made of individuals born in 1901 and the last in 1979. Our pseudo-panel includes 407 cohort observations, because not all cohorts are observed in each survey. Cohort sizes, which vary depending on the sample, are described in Table 1.

Table 1. Size of observed cohorts

	Both sexes		Men		Women	
	All	N.B.	All	N.B.	All	N.B.
Mean size	288	220	138	107	150	113
Minimal size	39	31	15	11	24	18
Maximal size	574	524	277	264	305	277
P100	94%	90%	72%	51%	80%	59%

Note: N. B. stands for "No *Baccalauréat*" and P100 stands for "Proportion of cohorts whose size is greater than 100 individuals".

Small sizes were mainly a concern among older cohorts, and particularly men as their life expectancy is lower. The population without a *Baccalauréat* represents 76% of the mean size of cohorts. And unfortunately in many cohorts, the population with a *Baccalauréat* is too small to produce robust estimates. The proportion lacking a *Baccalauréat* decreases with the cohort birth date. According to the 2010 survey, those without a *Baccalauréat represented* around 87% for cohorts born 1926-35, 70% for

cohorts born 1946-55, and 45% for cohorts born 1966-75. However, comparing by sex reveals a striking reversal: the proportion was larger among women than for men (88% vs 85%) for cohorts 1926-35, was equal for cohorts 1946-55, and became lower among women (43% vs 49%) for cohorts 1966-75.

Reprocessed data may be presented chronologically. For instance, Figures 1 and 2 represent the disposable income and the private consumption by age for 16 generations of persons who do not have the *Baccalauréat*. These generations were established using the 79 annual cohorts defined above. A generation's relevant variable is defined using the mean of five consecutive cohorts, except for the first generation which consists of 4 cohorts. Two main observations can be made. First, both profiles display a hump-shaped function of age with a maximum around 40 years-old for disposable income and around 60 years-old for private consumption. Second, for most ages and generations, we notice an increase that benefit to the younger generations. Profiles for the whole population are generally similar except that the ages at which the maximum is reached may differ (see Figures II and IV in d'Albis and Badji 2017).

Figure 1 about here

Figure 2 about here

To sum up, we built pseudo-cohorts for 24 variables: our four estimates of the standard of living (disposable income, disposable income without imputed rents, private consumption, private consumption without housing expenses) which are decomposed by sex and educational attainment into six categories, as indicated in Table 1. For discussion purposes, we have also created a set of additional variables: they are the shares of disposable income of a subpopulation within the disposable income of the whole population. In particular, we computed the share of disposable income of men

and the share of disposable income of men without a *Baccalauréat*. As for the previous variables, those shares are cohort and time specific.

2.3 Estimation Strategy

The simultaneous introduction of the age, cohort (*i.e.* date of birth) and period variables in the estimates creates a collinearity problem because the survey year is equal to the sum of the age and cohort variables. As discussed in d'Albis and Badji (2017), various solutions were proposed in the literature to resolve this problem. We follow the most common strategy, from Deaton and Paxson (1994), which imposes restrictions on the estimated parameters. This approach assumes that period effects sum to zero and are orthogonal to the long-term trend. Implicitly, the authors assume that macro-economic change can be broken down into a trend and a cycle. The cycle is fully imputed to the period effect whereas the trend is captured by the age and cohort effects. Nevertheless, this strategy has some limitations. In particular, the age and cohort effects incorporate the long-term trend due to the assumption made for period effect.

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

$$log\bar{y}_{jt} = \mu + \sum_i \alpha_i \, 1_{a_{jt}} + \sum_c \beta_c \, 1_c + \sum_t \gamma_t \, 1_t + \bar{\varepsilon}_{ct},$$

where $\bar{y}_{jt}$ represents the explained variable related to cohort *j = 1901, 1902,..., 1979* and survey dates *t = 1979, 1984,..., 2010*, $1_{a_{jt}}$ represent the indicators of the five-year age brackets from 25-29 years old to 80-84 years old[6] associated with cohort *j* at date

[6] We exclude people aged under 25 and over 84 as they are less representative of their generation in the BdF survey than intermediary age categories. This is because the proportion of these people living in an institution or other household is greater and numbers in the various databases are lower.

t, 1_c represent the indicators of the cohorts, and 1_t represent the indicators associated with survey dates t. The equation is the same when we estimate the shares of disposable income of a subpopulation within the disposable income of the whole population, except that we do not take their logarithm.

In order to cancel out the collinearity relationship, we use the Deaton and Paxson (1994) method and require the sum of the period effects to be zero and orthogonal to the long-term trend. Formally, this gives:

$$\sum_t \gamma_t = 0 \quad \text{and} \quad \sum_t (t \times \gamma_t) = 0.$$

In concrete terms, this method involves introducing variables noted here as d^*_{ts}, rather than period indicators, into the estimated equations. These variables are obtained using period indicators and the following relation:

$$d^*_{ts} = d_{ts} - \frac{ts-t1}{t2-t1} \times d_{t2} + \frac{ts-t2}{t2-t1} \times d_{t1} \quad \text{with} \quad s \geq 3 \quad \text{and} \quad d^*_{t1} = d^*_{t2} = 0$$

where d_{ts} is the year *ts* dummy.

We estimated our equation for each of the variables of interest, which represents 24 estimates. As shown in Table A1 which can be found in the Appendix, in all instances, tests for fixed individual effects (which are cohort effects in our case, given by the term $\sum_c \beta_c 1_c$) are positive, which justifies our choice of a fixed effects model. More precisely, we estimate a Least Square Dummy Variable type fixed effects model. We also estimate three shares of disposable income of a subpopulation within the disposable income of the whole population and also selected a fixed effect model for those regressions.

3 Results

We now present our results by successively analyzing cohort and age effects on the four standard of living measures presented above. We first compare the effects for the whole population to those for the population without a *Baccalauréat*; then, we analyze separately the effects for men and women. This analysis is followed by general discussion. Period effects are not discussed here because they are not directly related to the research question of this article. All estimates are available upon request.

3.1 Standard of Living across Cohorts

For cohorts, the results are given by the estimates of the β_c of the econometric model, expressed as a deviation from a reference cohort, the one born in 1946. In the figures, the grey lines delimit the confidence interval at 5%.

Figures 3 and 4 represent the disposable income and private consumption for the whole population, as functions of the birth date when we control for age and period effects. Those estimates are similar to those presented by d'Albis and Badji (2017), except that we consider here individualized data rather than household data controlled for the size of the household. Disposable income by date of birth (Figure 3) displays two major periods. For the cohorts born before the Second World War, income significantly increased across generations: from the 1926 cohort to the 1946 cohort it increased by 50.9%. Conversely, for post-war generations, the increase is much less pronounced and, for most cohorts, there has not been any significant change. When we exclude imputed rents, the overall pattern is similar, although the increase is a bit less pronounced (see Figure A1 in the Appendix). For instance, from the 1926 cohort to the 1946 cohort disposable income without imputed rents rose by 43.1%. The stagnation in disposable income reveals in particular that the baby-boom cohorts do

not appear to have had higher living standards than those who followed them (d'Albis and Badji 2017).

Figure 3 about here

As mentioned in d'Albis and Badji (2017), the picture is different when private consumption is used as an indicator of the standard of living (Figure 2). The plateau that started in 1946 lasted until 1961, at which time consumption significantly increased. The consumption of individuals of cohort 1966 is 23.3% higher than that of those who were born 20 years earlier, while the consumption of individuals of cohort 1976 is 37.9% higher than that of those born in 1956. As it was the case for disposable income, the increase in consumption across generations is lessened if housing expenses are excluded (see Figure A2 in the Appendix).

Figure 4 about here

When we restrict to the population without a *Baccalauréat*, the evolution of the standards of living across generations is rather different. Disposable income (Figure 5) first increased and then decreased, revealing that cohorts who were born between 1943 and 1950 enjoyed a larger disposable income that those who were born before and after them. For instance, individuals without a *Baccalauréat* born in 1946 enjoyed a disposable income that is 26.7% larger than the one of those who were born in 1926 and 7.4% larger than the one of those who were born in 1966. When we exclude the imputed rents, the "favored" cohorts are those born between 1939 and 1950 and the shape of the curve is more symmetrical, with the figures of the latter example being respectively 17.9% and 10.6% (see Figure A3 in the Appendix). As a consequence, the share of the disposable income of individuals without a *Baccalauréat* within the disposable income of the whole population has continuously declined over generations (Figure 6). The decline reaches 13.1% between cohort 1926 and cohort 1946 and 26.8%

between cohort 1926 and cohort 1966. These figures illustrate the relative generational downgrading of the less qualified.

Figure 5 about here

Figure 6 about here

Figure 5 suggests that less educated individuals born during and right after the Second World War had a relative generational advantage, compared to those born before and after them. However this fact is not observed when we examine consumption (Figure 7). There is no significant change between cohort 1939 and cohort 1969, and starting from cohort 1970, we observe a significant increase. For instance, individuals without a *Baccalauréat* born in 1976 enjoy a consumption that is 17.6% higher than that of those who were born in 1956. However this increase does not appear to be robust, as we no longer observe it when excluding housing expenses from consumption (see Figure A4 in the Appendix).

Figure 7 about here

The breakdown of disposable income by sex reveals diverging trends. The population of men (Figure 8) has seen a much flatter variation in disposable income than the population as a whole. The rise for the pre-war cohorts is less marked and there is no further relative improvement for the 1970s cohorts compared with the 1946 cohort. As a consequence, the share of the disposable income of men within the disposable income of the whole population has generally declined over generations (Figure 9). The decrease is significant for cohorts born during the Second World War and those born after 1970.

Figure 8 about here

Figure 9 about here

The results are totally different for the population of women (Figure 10), who enjoyed a considerable increase in standard of living. For example, between the women of the 1926 cohort and those of the 1946 cohort, disposable income rose by 118.1%, and from the 1946 to 1966 cohorts by 23.9%. Furthermore, all the cohorts born after 1961 have a significantly higher income than the 1946 cohort. When excluding imputed rents we observe few differences and the magnitude of the increase is similar (see Figures A5 and A6 in the Appendix). Since one assumes consumption is equally shared among adults in each household, the breakdown of consumption by sex does not reveal information not already shown in Figure 4.

Figure 10 about here

The contrasting evolution of disposable income across generations when decomposed by sex can be easily explained by the large increase in women's labor market participation over the past century. For instance, according to the French national statistical institute INSEE, the employment rate of women aged 25-49 is currently 75% whereas it was only 40% in 1950. Gender differences also play a role in the evolution of disposable income across generations of persons without a *Baccalauréat*. The picture presented in Figure 5 is completely different when men and women are studied separately. For men (Figure 11), we observe no significant differences during a long time interval that starts with cohort 1918 and ends with cohort 1950. After that, the decline is rather steep. Men without a *Baccalauréat* who were born in 1976 have a 24.2% lower disposable income than those born in 1946. The share of disposable income of men without a *Baccalauréat* within the disposable income of the whole population declines tremendously over generations (Figure 12). The decline represents

a 25.7% drop for cohorts between 1926 and 1946, and a 39.1% drop between 1926 and 1966.

Figure 11 about here

Figure 12 about here

For women without a *Baccalauréat* (Figure 13), the situation is different, as disposable income remains stable across all cohorts born after the Second World War. The comparison of Figures 11 and 13 with Figures 8 and 10 suggests that the situation of persons with tertiary education has improved since cohort 1946, both for men and women.

Figure 13 about here

3.2 Standard of Living across Age Groups

The Figures below represent disposable income and private consumption as functions of age, when we control for cohort and period effects. More precisely, they represent the estimates of the α_i of the econometric model. Figure 14 and 16 consider the whole population whereas Figures 15 and 17 consider persons without a *Baccalauréat*. The results are expressed as a deviation from a reference age group, 45-49 year olds[7]. As above, the grey lines delimit the confidence interval at 5%.

Taking the population as a whole (Figure 14), disposable income by age increases sharply (+56%) from ages 27 to 47, then levels out until 62 and finally rises moderately (+24.9%) until age 82. One possible explanation of the rise in income after age 62 may

[7] For ease of viewing, we have named each age group after its median. Thus the 45-49 age group is named 47.

be a composition effect similar to the one described in literature on the missing poor in poverty statistics. Since longevity correlates with income, the proportion of low-income people declines as one moves from one higher age group to the next. However, among persons without a *Baccalauréat* (Figure 15), we still observe an increase after age 62, which suggests that the missing poor hypothesis is not likely to apply here. It is actually the decomposition by sex that allows us to understand the rise at late age. After age 47, disposable income tends to flatten for men, whereas it increases for women. This could be explained by the facts that women have lower labor income and are more likely to survive their husband, which mechanically increase the income that would have been shared at old-age such as capital income. Then, the increase in disposable income after age 62 can be understood by a gender composition effect.

Importantly, Figures 14 and 15 reveal a strong difference across education group. Disposable income from ages 27 to 47 increases more gradually for persons without a *Baccalauréat* than for the population as a whole – in the end only a 27.3% rise. Also, a significant decline is observed around the retirement age- 11.4% less disposable income at age 62 than at age 47. The general picture is that income is much flatter with age for persons without a *Baccalauréat* than for the rest of the population.

Figure 14 about here

Figure 15 about here

Those differences in disposable income do not translate to consumption profiles, which are remarkably similar across education groups (Figures 16 and 17). There is a significant increase in consumption over the life-cycle which reaches +26.6% from ages 27 to 47 and +40.8% from ages 47 to 67 for the whole population and, respectively +23.2% and +34.3% for the group without a *Baccalauréat*. It is interesting to highlight that those findings are consistent with the traditional life-cycle theory that says that

income does not influence the slope of the consumption profile but its level. When housing expense are excluded, we observe a small decline in consumption after age 67 (see Figure A7 in the Appendix).

Figure 16 about here

Figure 17 about here

3.3 Discussion

We first remark that there can be inequality between age groups without any generation losing out. For the whole population, disposable income and private consumption by age slope up. This implies that a person of a given age has on average a standard of living higher than or equal to that of a younger person, after controlling for cohort and period effects. But the fact that the young are less rich than their current seniors does not mean that they lose out: in our estimates, their standard of living is always higher than or equal to that of those of previous generations at the same age. D'Albis and Badji (2017) show that this is due to economic growth. Although the growth in real per capita GDP was less vigorous than during the thirty years that followed the Second World War, it still increased 50% over the study period (1979-2010). If we assume that equity between generations is ensured as long as their standard of living does not deteriorate, we may conclude that the relative position of French cohorts born from 1901 to 1979 has been equitable.

Our breakdown of the population into men and women, however, leads us to qualify this observation. It is clear that the rise in standard of living has been mainly enjoyed by women, whose economic position has greatly improved over this period. As an illustration, 80% of French women who were born in 1960 were part of the working population at age 40, against 65% of those born in 1940 (Afsa-Essafi and Buffeteau

2006). Conversely, men's disposable income has varied little for all the cohorts born after the Second World War. Men's standard of living has not gotten worse, but it has not improved as much as women's. This point in no way detracts from the fact that men's disposable income is much higher than women's. Our observation merely reveals a catching up in women's position with respect to men's. As a consequence, the relative position, in terms of disposable income, of men within the population has declined across cohorts.

But the breakdown by qualification is even more instructive. We see that men without a *Baccalauréat* not only experience a fall in disposable income around retirement age, but also experienced a strong generational decline after 1950, all cohorts being significantly worse off than those who were born between 1918 and 1950. This decline do not appear for women without a *Baccalauréat* as it was probably compensated by an increase in their participation in the labor market. Three conclusions may be drawn from this. First, if we restrict to the population of men without a *Baccalauréat*, we can observe that intergenerational equity deteriorates continuously since cohort 1950. Technical progress, globalization and public policies certainly improved the average standard of living in France since the 1970, but the non-educated men born after the Second World War did not benefit from this improvement. Second, we never found that the baby boom generation had higher standard of living than the generations that followed. In the only case where we find a deterioration, i.e. for men without a *Baccalauréat*, it is more the generations that were born in the 1930s and in the 1940s that could be considered as favored. Finally, men without a *Baccalauréat* have clearly suffered a large decline of their relative economic position as their share of disposable income within the average income of the population was nearly halved between cohort 1926 and cohort 1966.

Our results complement recent studies that analyze the evolution of intergenerational mobility. The perspective is different as we measure relative position (Goldthorpe,

2012), but it helps to better understand perceptions about intergenerational equity. Lefranc (2018) shows that men's intergenerational income persistence has strengthened since the cohorts born in the 1950s, and Alesina et al. (2018) show that the French, like other Europeans, are pessimistic about intergenerational mobility. Vallet (2017) concludes that intergenerational mobility via social class increased for younger cohorts and that the increase was larger for women than for men, while Ben-Halima et al. (2014) show that the intergenerational persistence was lower for daughter than for son.

4 Concluding Remarks

In this article, we examine the variation in standard of living between generations and over the lifespan in France. We show that, generally speaking, standard of living did not decline from generation to generation. However, a breakdown by sex does reveal that women's position has considerably improved while men's has stagnated for all cohorts born after the Second World War. When we restrict to the population without a *Baccalauréat*, we show that men who were born after 1950 experienced a significant decline in disposable income compared to those born between 1918 and 1950. Conversely, women without a *Baccalauréat* did not experience such a decline. The tremendous proliferation of education in France has clearly benefited younger cohorts -on average- and thus maintained some intergenerational equity. However, men who did not complete the secondary education, who became a minority within younger cohorts, suffered from intergenerational inequality when compared to similarly educated men in previous cohorts.

This research could be improved by including other dimensions of economic welfare. An obvious one is life expectancy. It is clear that improvement here is a barometer of progress for a society and a source of individual well-being. Therefore this variable is often included in composite indicators as, e.g., in d'Albis and Badji (2019). In the same

vein, it could be interesting to obtain mortality measures by educational attainment (Murtin et al. 2017) to see whether they soften our findings on less educated men. Case and Deaton (2015)'s work suggests it might not be the case, as they revealed that in the U.S. less educated white men experienced a decline in life expectancy. Leisure is also a major constituent of well-being (Jones and Klenow 2016). The centuries-long reduction in working hours in all developed countries (Boppart and Krusell 2016) is likely to increase leisure time from one generation to the next. This would tend to support our basic conclusions that the economic welfare of generations has not declined and equity between generations has been preserved. It would, however, be useful to examine the differing changes for men and women by including time spent on domestic production. This cannot be done from the BdF survey alone, but would need to use the time-use survey (named *Emploi du Temps* in France), which unfortunately covers a much shorter period (d'Albis et al. 2016). A further avenue for research would be income inequalities. Here it would be useful to distinguish general inequalities from inequalities by age (d'Albis and Badji, 2020) and assess which most affect individuals' well-being. These last questions are on our research agenda.

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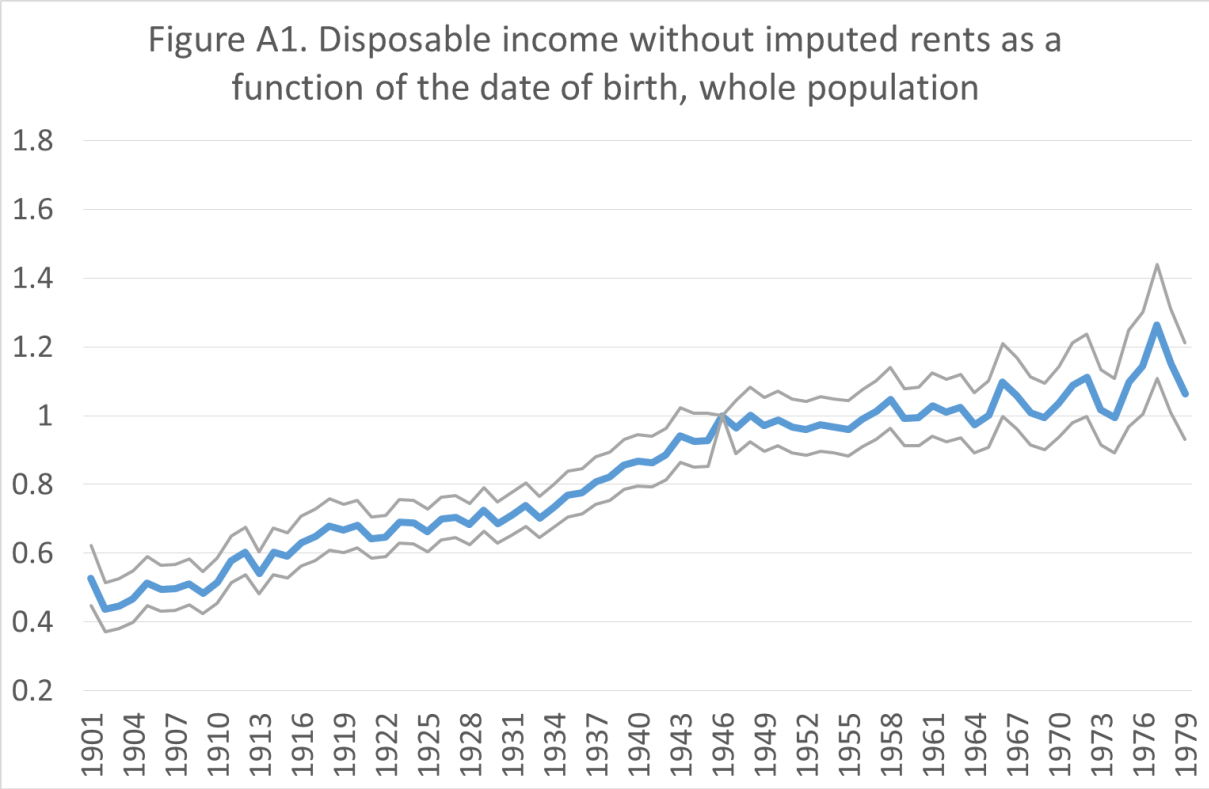
Appendix

Table A1. Test for fixed individual effects and Hausman test

		Individual effects test		Hausman test	
		F-statistic	P-value	F-statistic	P-value
Disposable income	All	17.15	0.00	300.80	0.00
	All Men	5.76	0.00	229.98	0.00
	All Women	28.22	0.00	329.92	0.00
	All N.B.	8.46	0.00	346.83	0.00
	N.B. Men	4.29	0.00	151.00	0.00
	N.B. Women	15.04	0.00	284.96	0.00
Disposable income without imputed rents	All	11.02	0.00	2381.70	0.00
	All Men	3.88	0.00	152.10	0.00
	All Women	21.07	0.00	311.55	0.00
	All N.B.	4.91	0.00	164.09	0.00
	N.B. Men	3.84	0.00	139.83	0.00
	N.B. Women	9.87	0.00	1807.04	0.00
Consumption	All	26.53	0.00	328.71	0.00
	All Men	16.17	0.00	299.62	0.00
	All Women	25.83	0.00	322.56	0.00
	All N.B.	14.39	0.00	16436.24	0.00
	N.B. Men	8.67	0.00	1071.74	0.00
	N.B. Women	14.58	0.00	278.81	0.00
Consumption without housing expenditures	All	13.41	0.00	6944.22	0.00
	All Men	8.46	0.00	1067.78	0.00
	All Women	12.34	0.00	6640.20	0.00
	All N.B.	6.09	0.00	387.99	0.00
	N.B. Men	3.73	0.00	95.86	0.00
	N.B. Women	6.30	0.00	322.32	0.00
Shares of disposable income	Men	4.77	0.00	308.55	0.00
	All N.B.	8.44	0.00	959.95	0.00
	N.B. Men	13.34	0.00	280.90	0.00

Reading note: Column 4, a P-value lower than 0.05 indicates that the test for individual effects is positive at the 5% threshold. Column 6, a P-value lower than 0.05 indicates that the fixed effects model is appropriate. N.B. stands for no *Baccalauréat*.

Additional Figures



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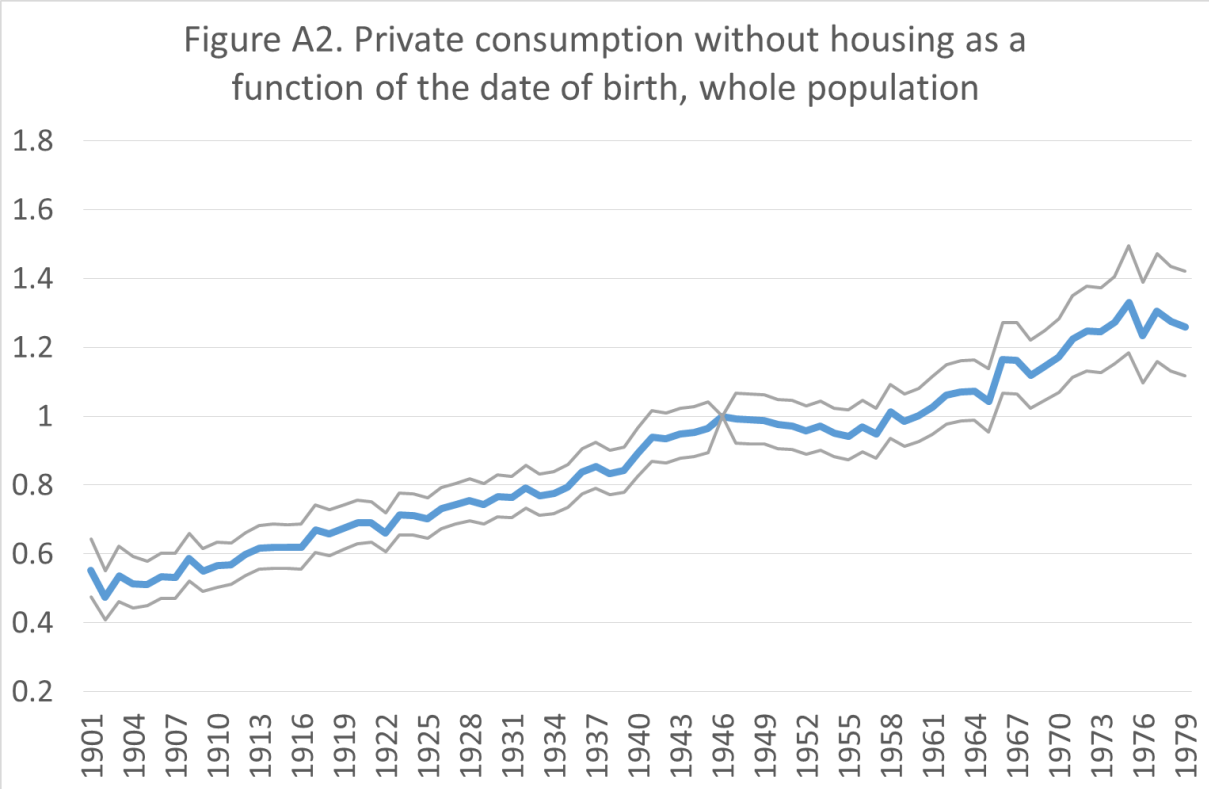

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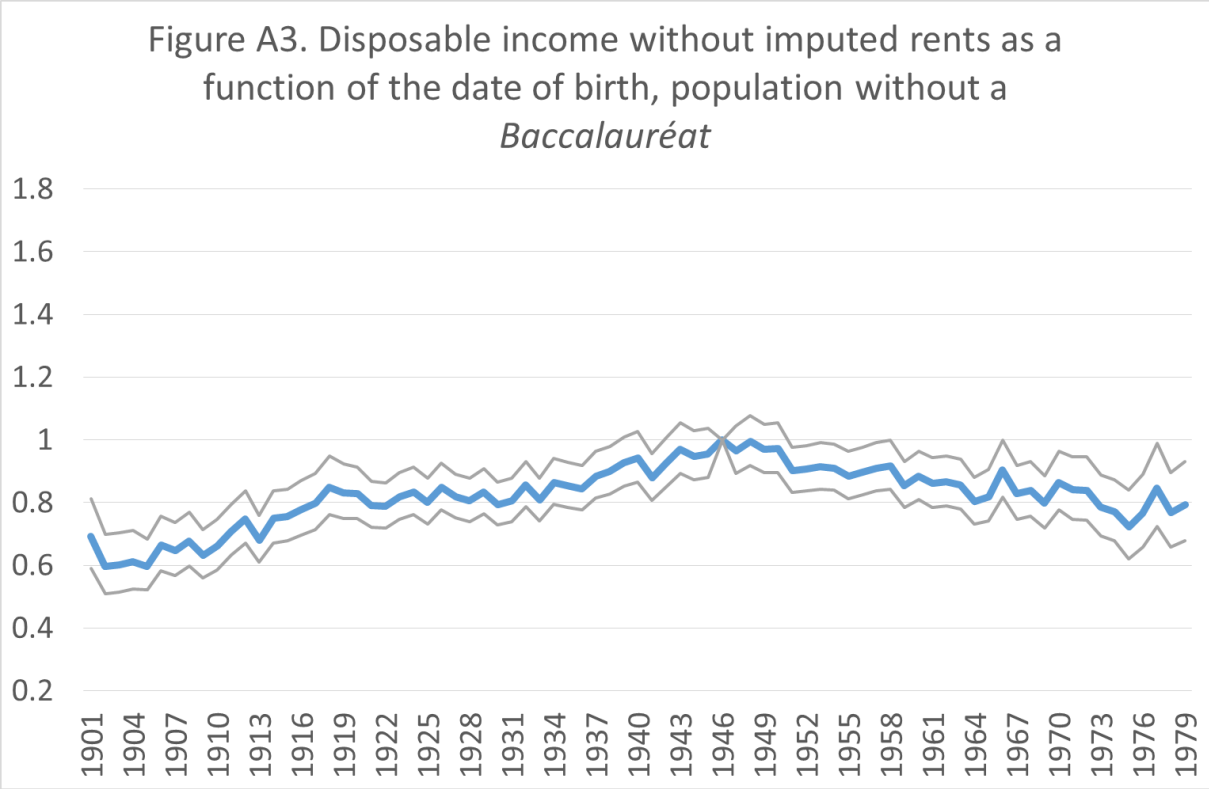

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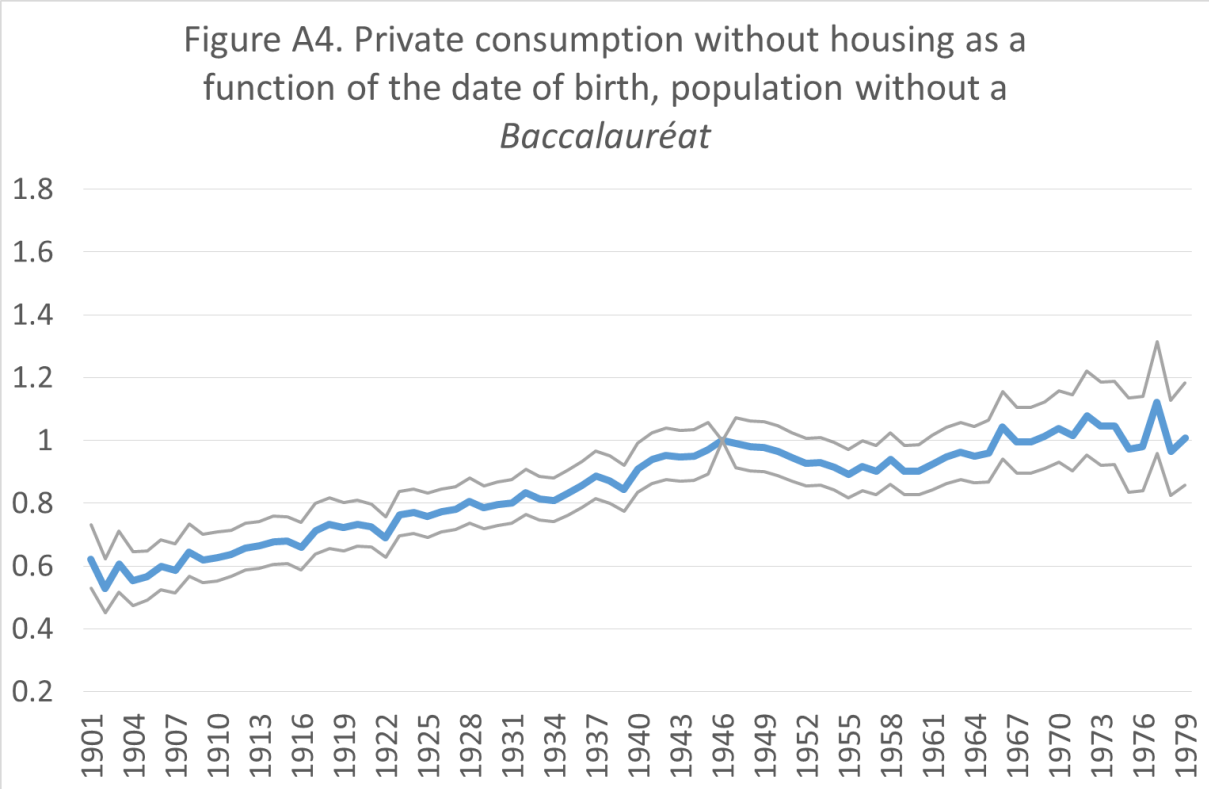

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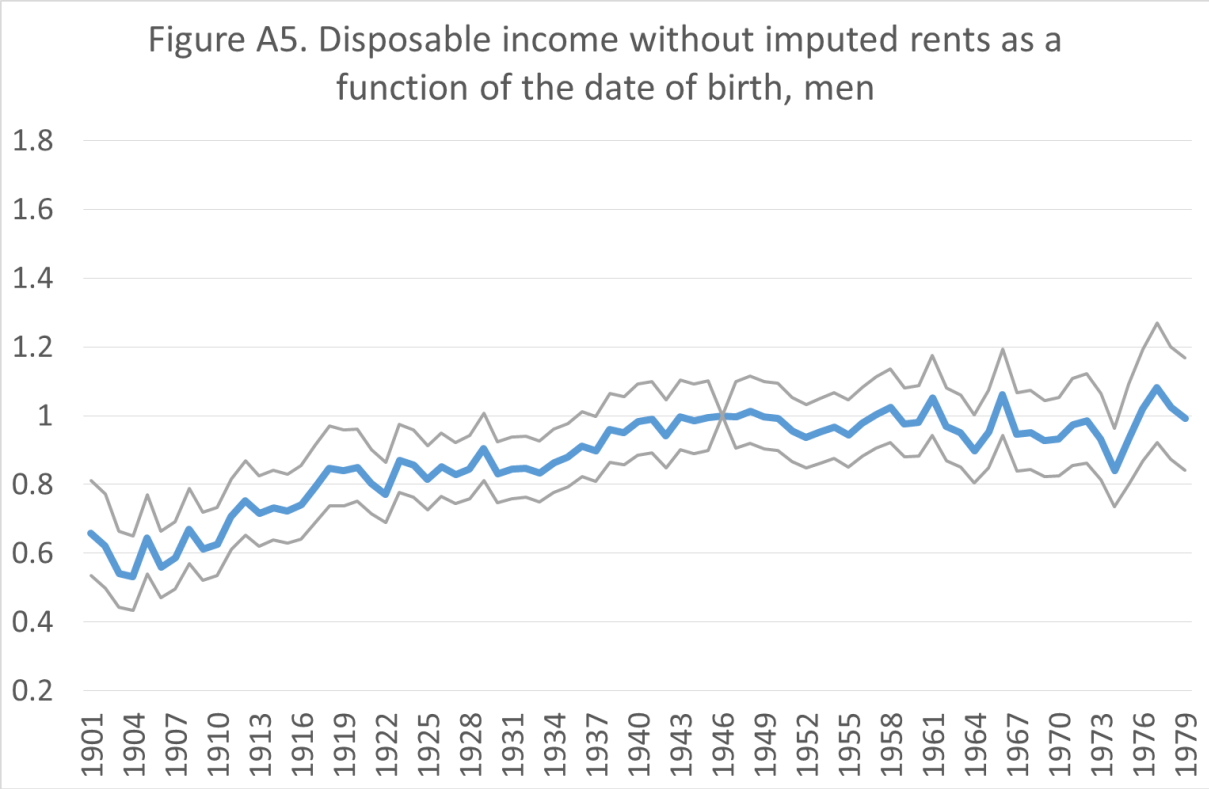

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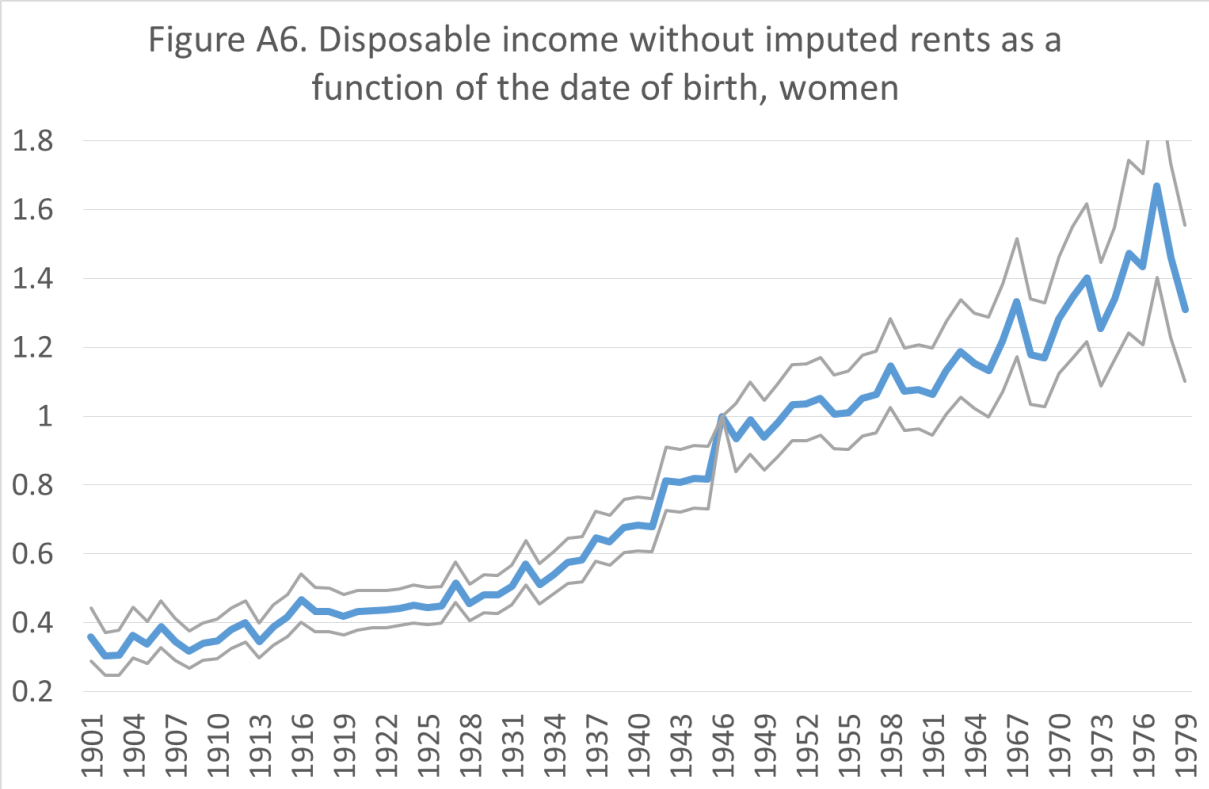

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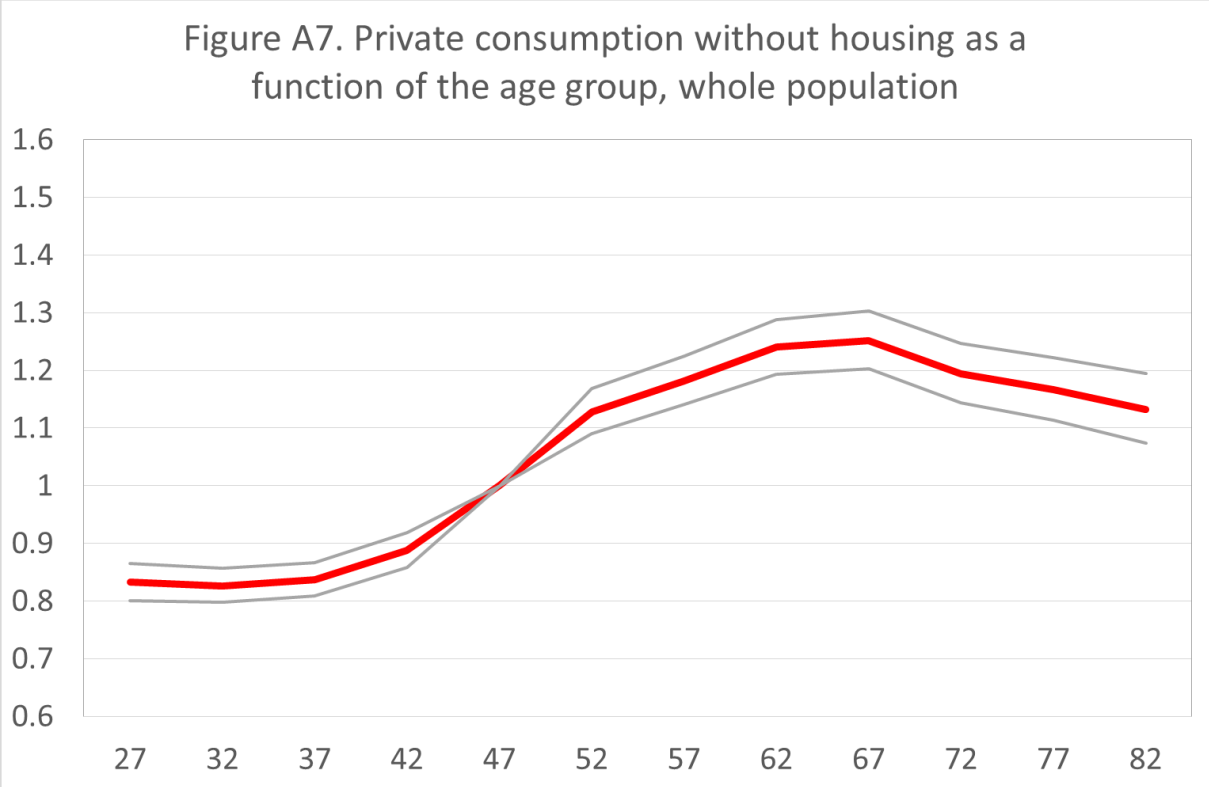

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Figures

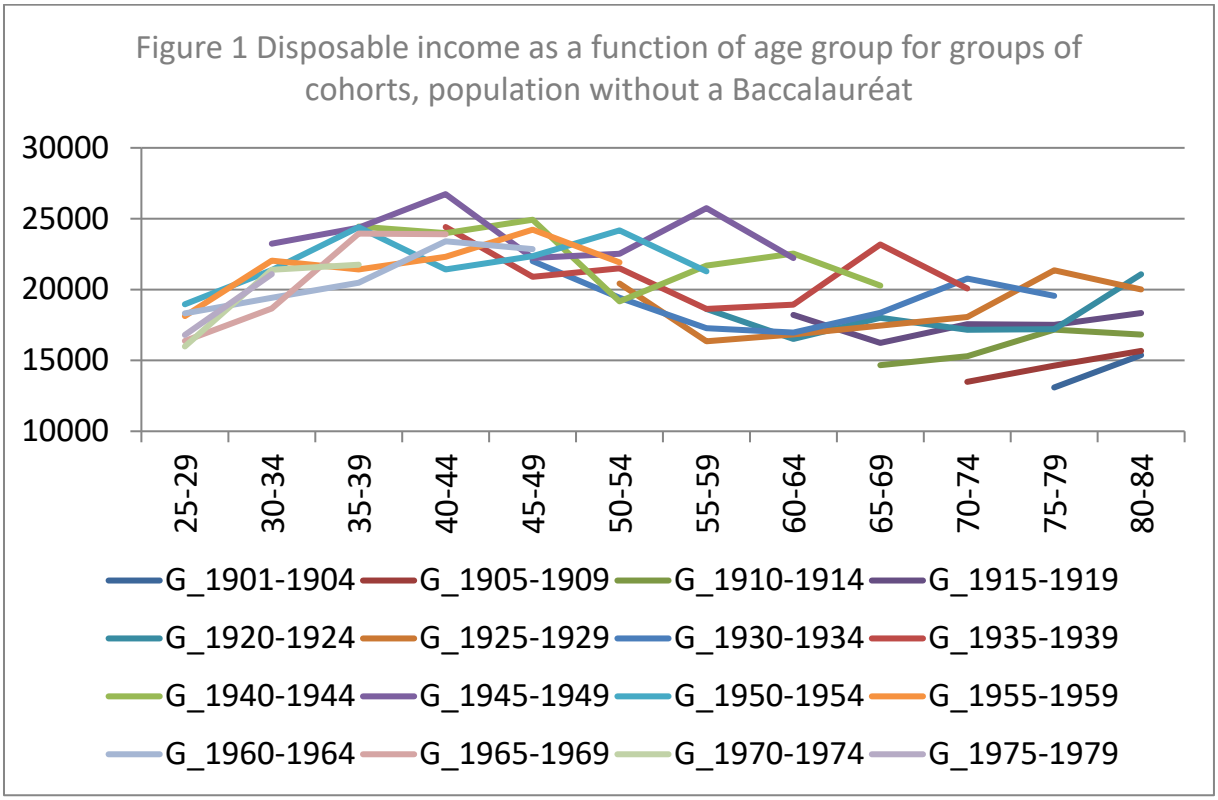
Figure 1 Disposable income as a function of age group for groups of cohorts, population without a Baccalauréat
30000
25000
20000
15000
10000
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
G_1901-1904
G_1905-1909
G_1910-1914
G_1915-1919
G_1920-1924
G_1925-1929
G_1930-1934
G_1935-1939
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G_1960-1964
G_1965-1969
G_1970-1974
G_1975-1979

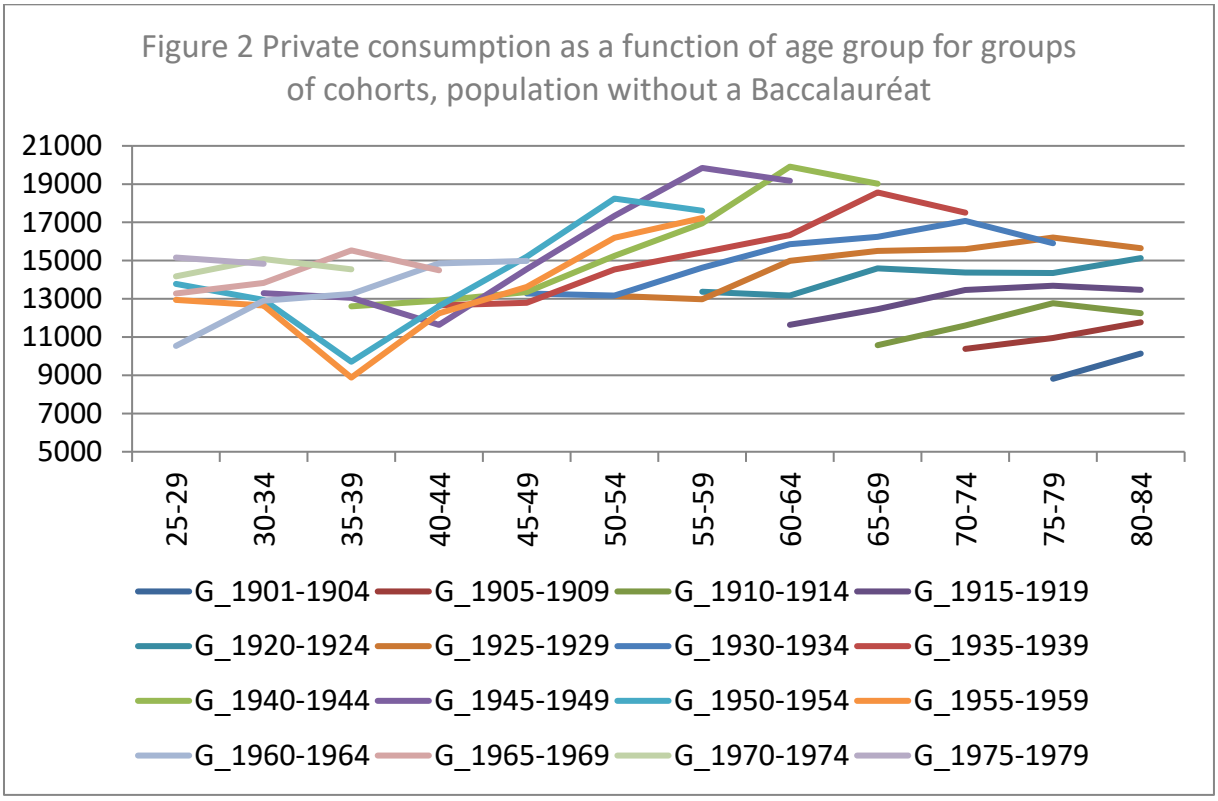
Figure 2 Private consumption as a function of age group for groups of cohorts, population without a Baccalauréat
21000
19000
17000
15000
13000
11000
9000
7000
5000
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
G_1901-1904
G_1905-1909
G_1910-1914
G_1915-1919
G_1920-1924
G_1925-1929
G_1930-1934
G_1935-1939
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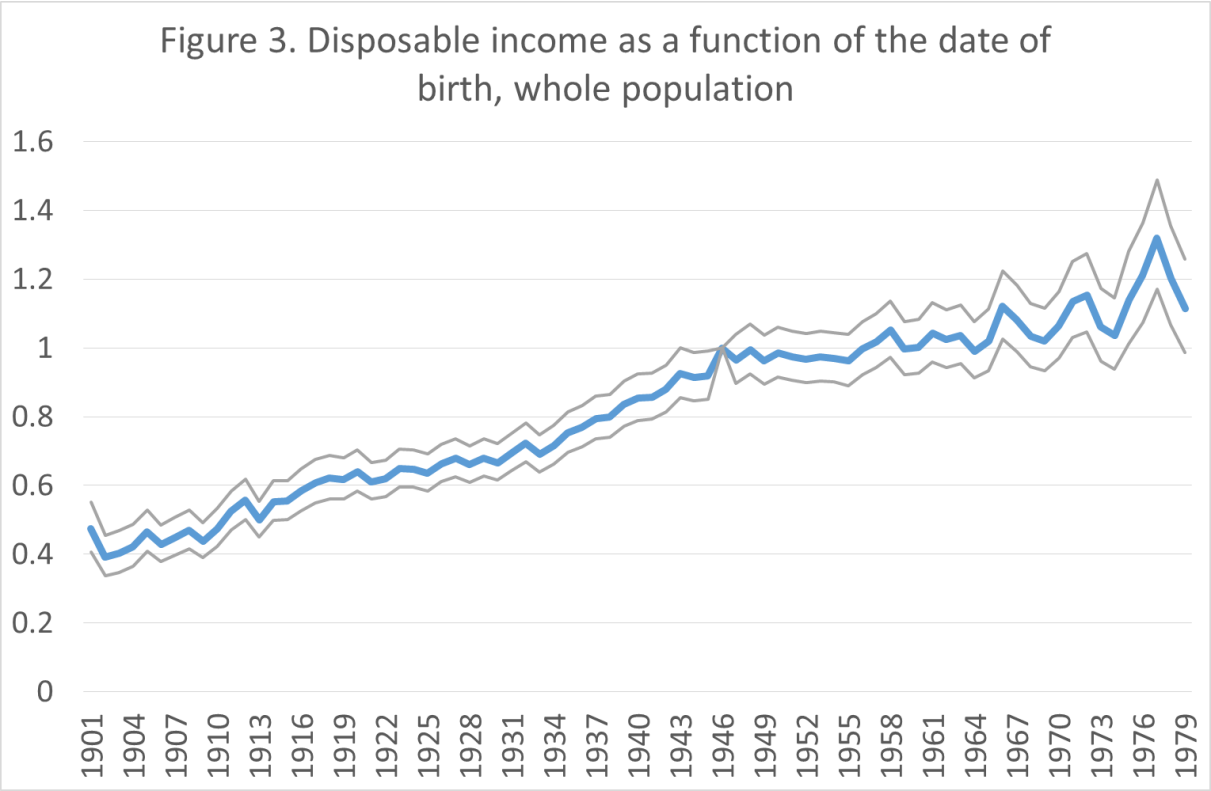
G_1965-1969
G_1970-1974
G_1975-1979



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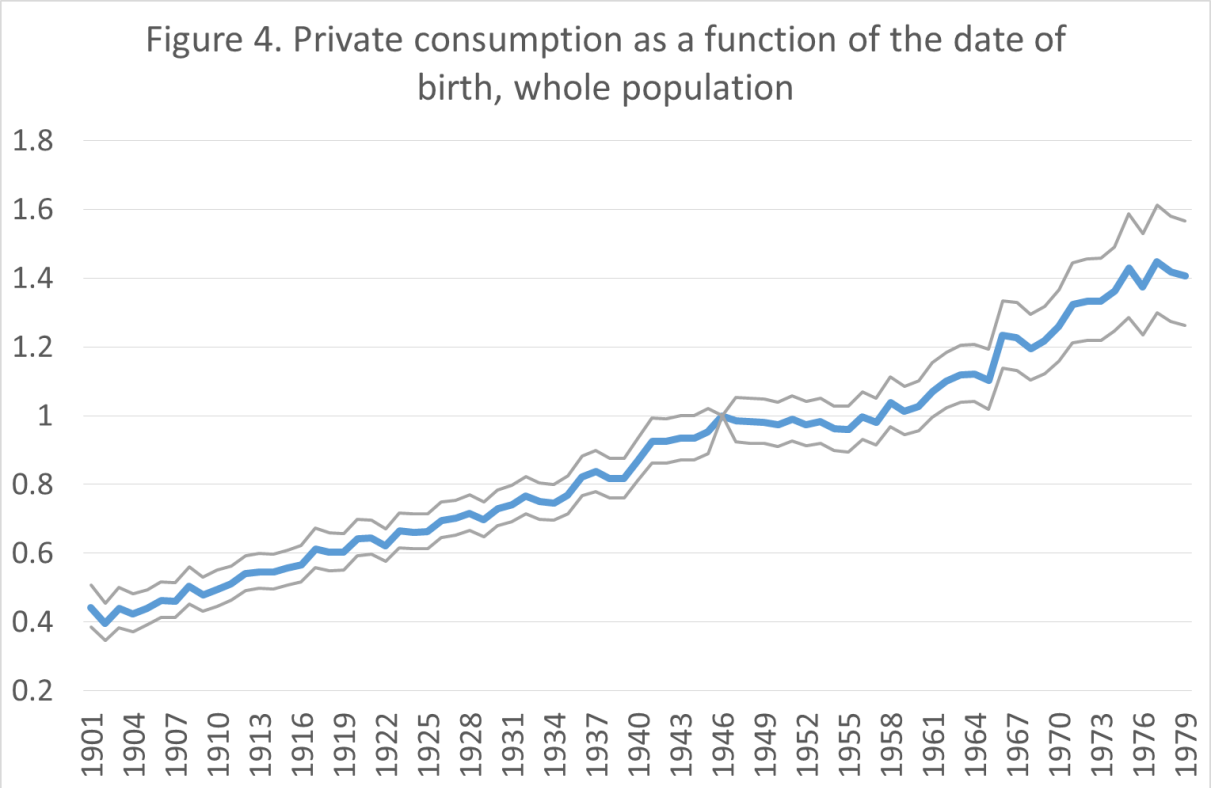

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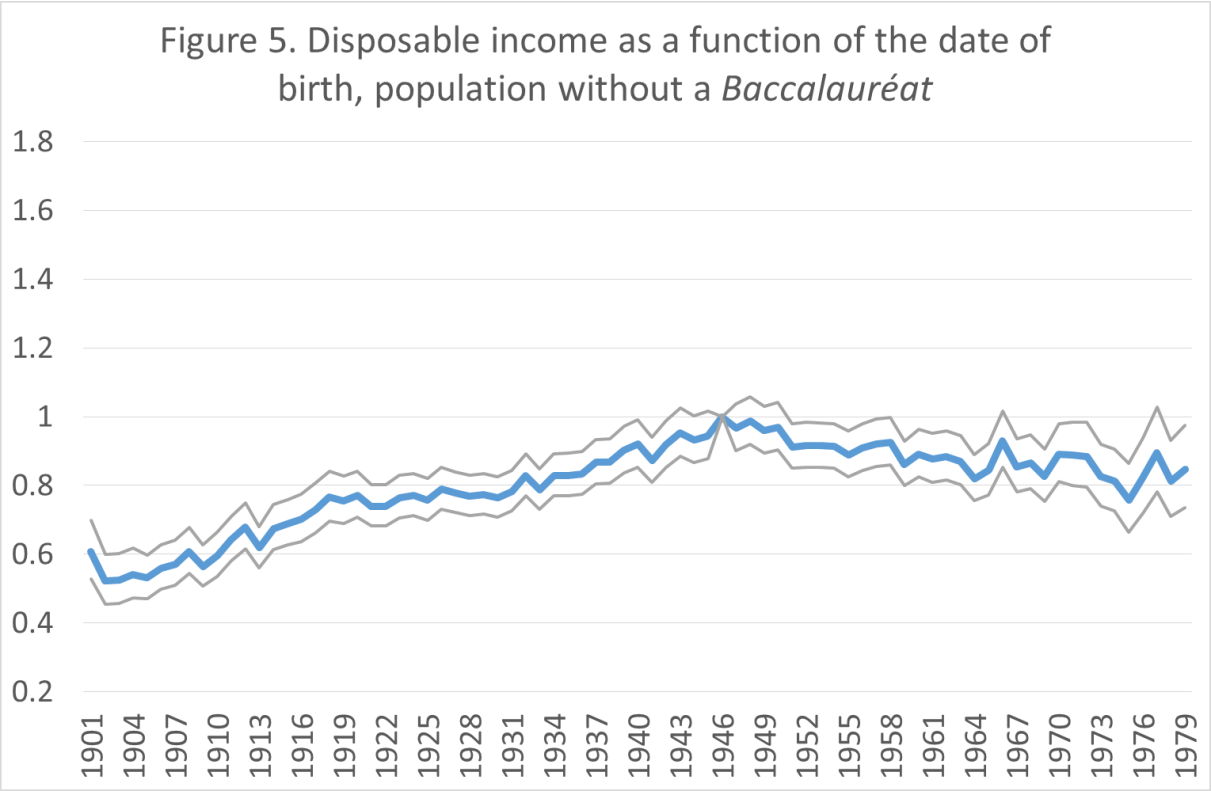

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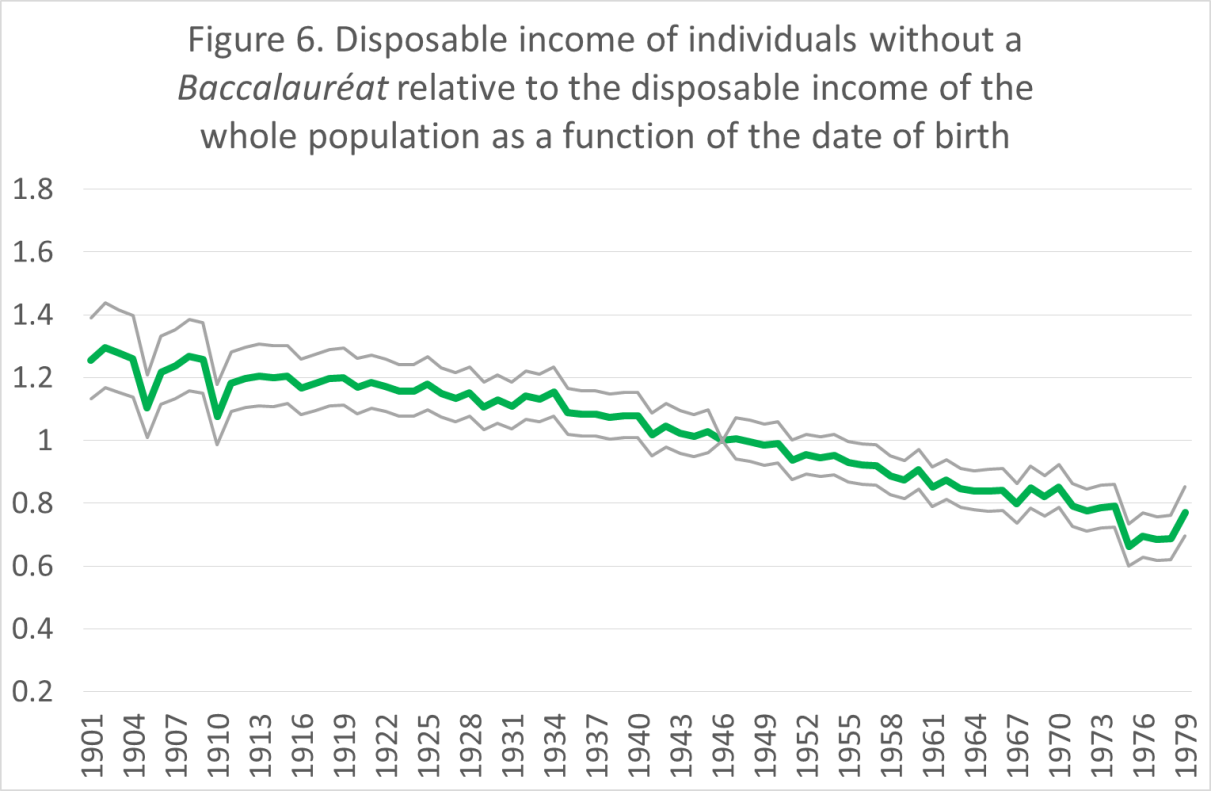

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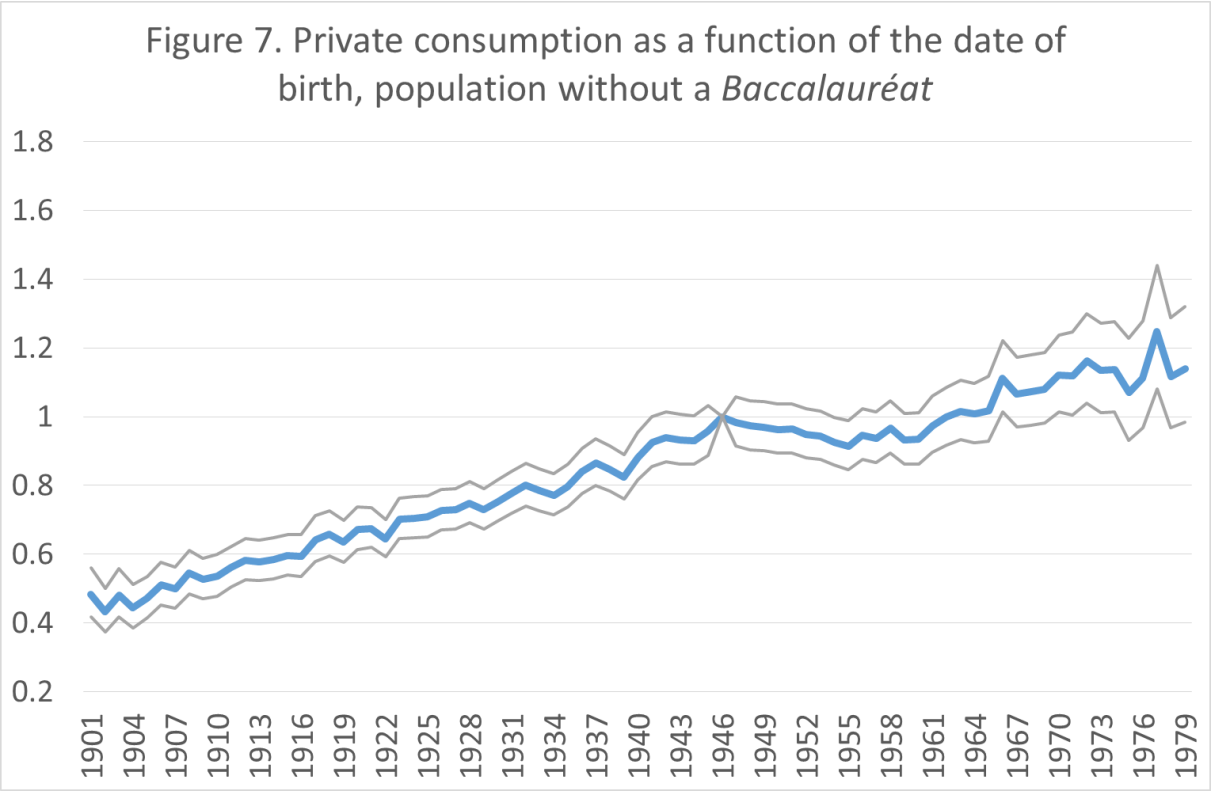

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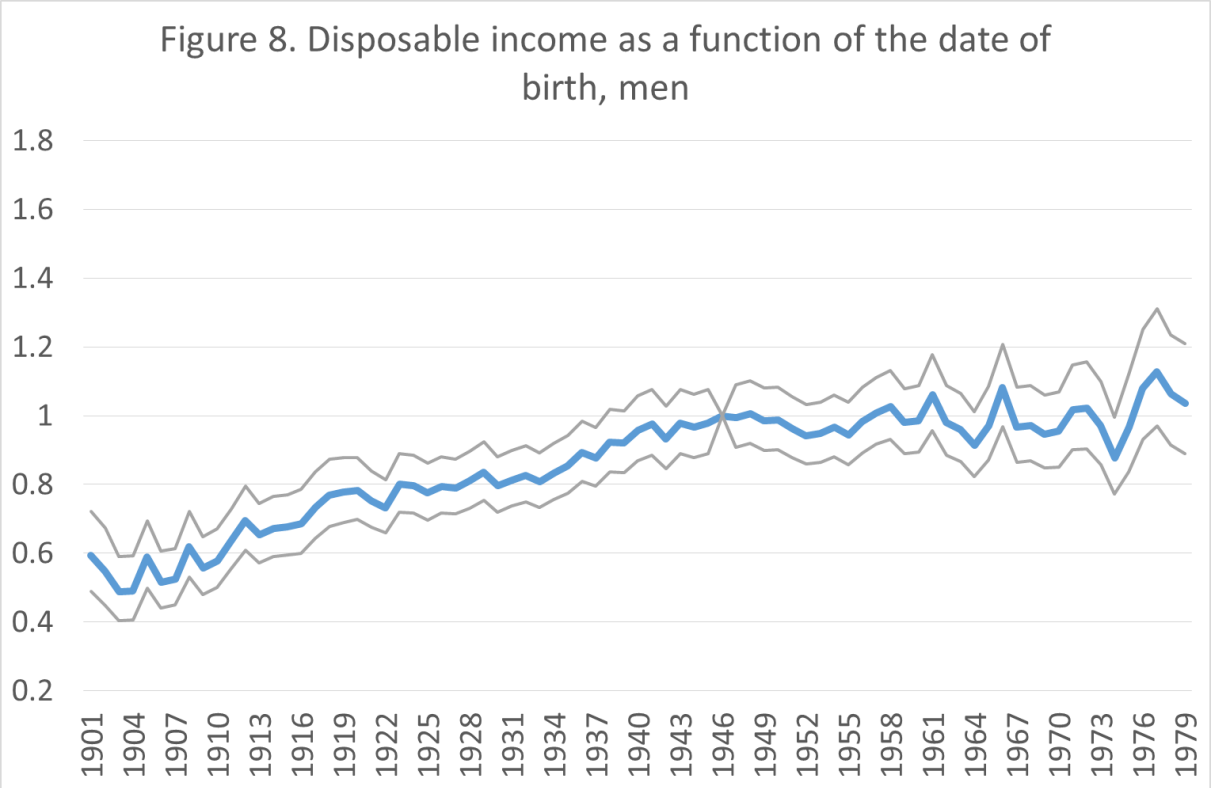

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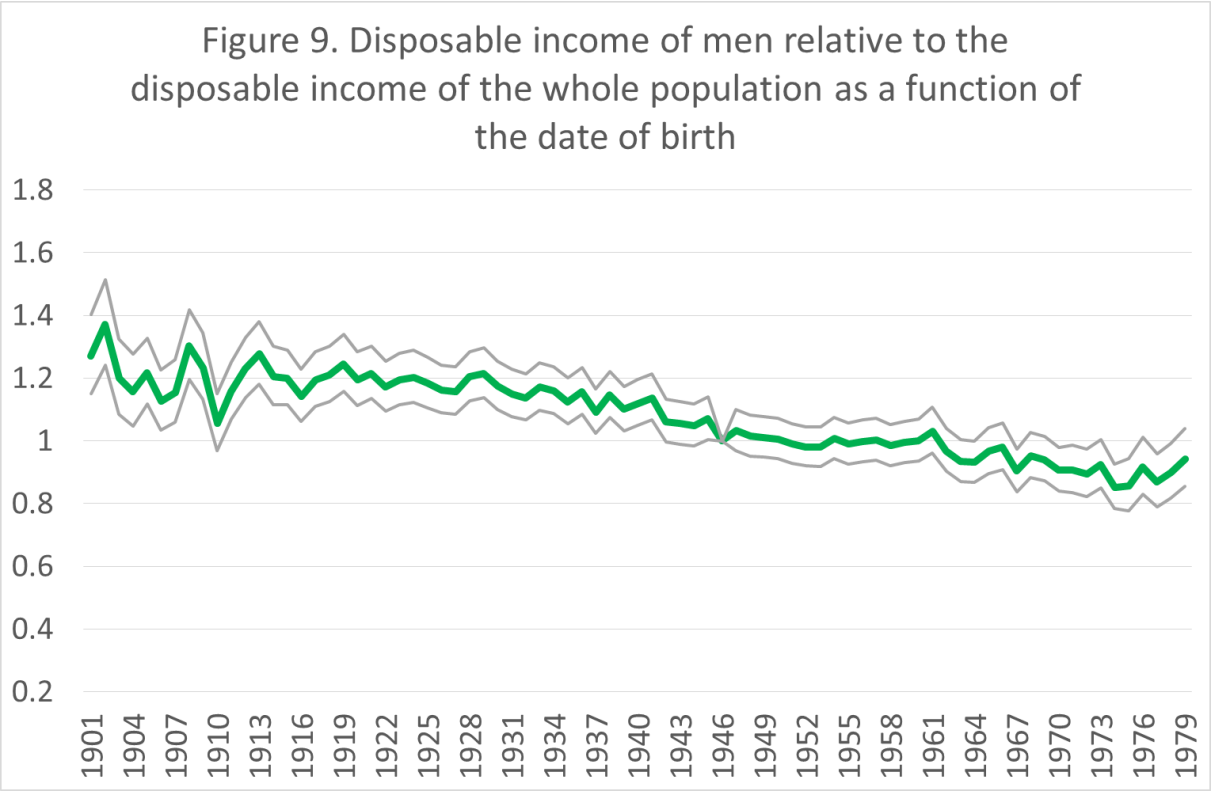

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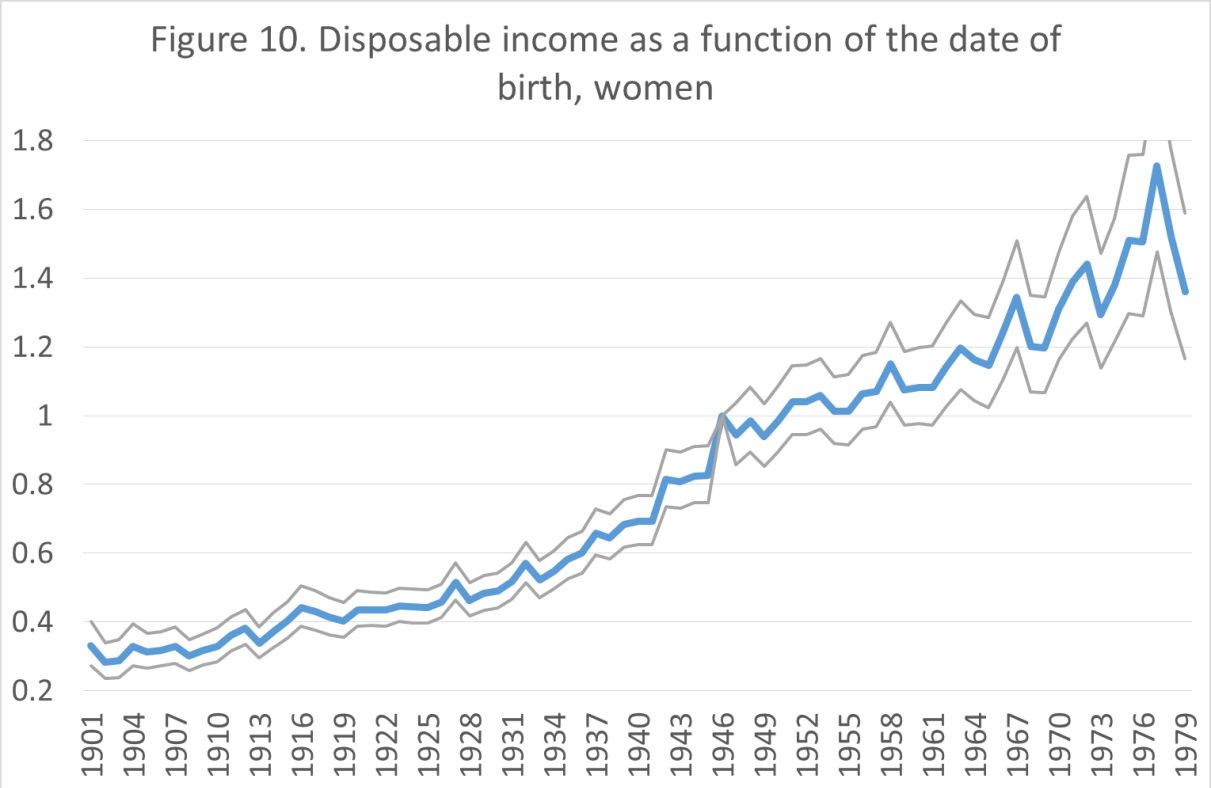

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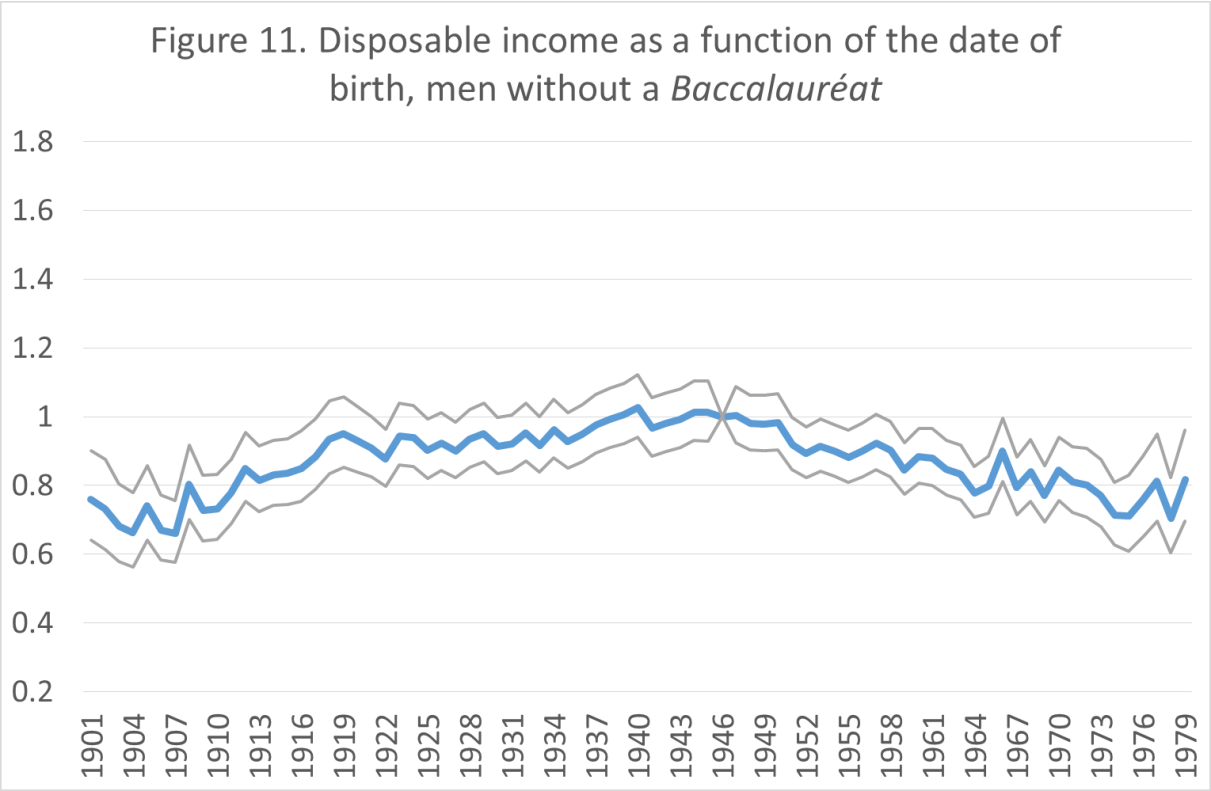

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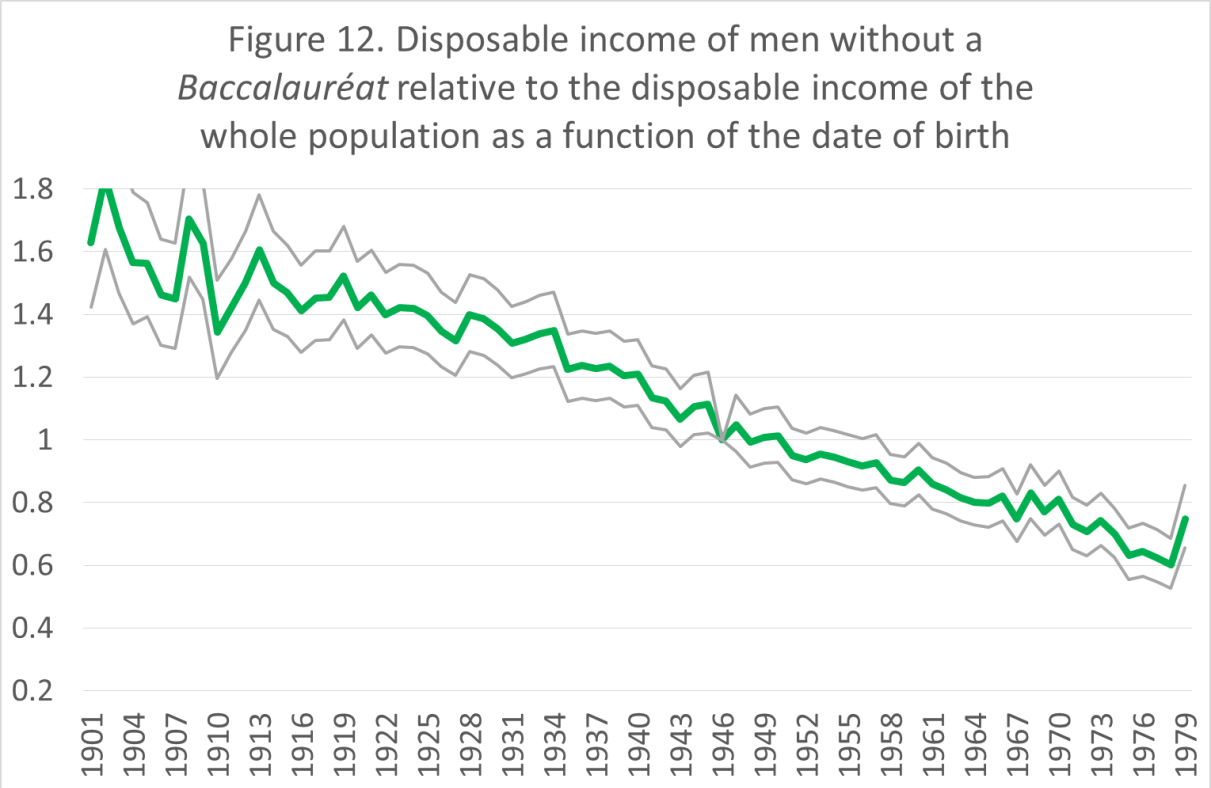

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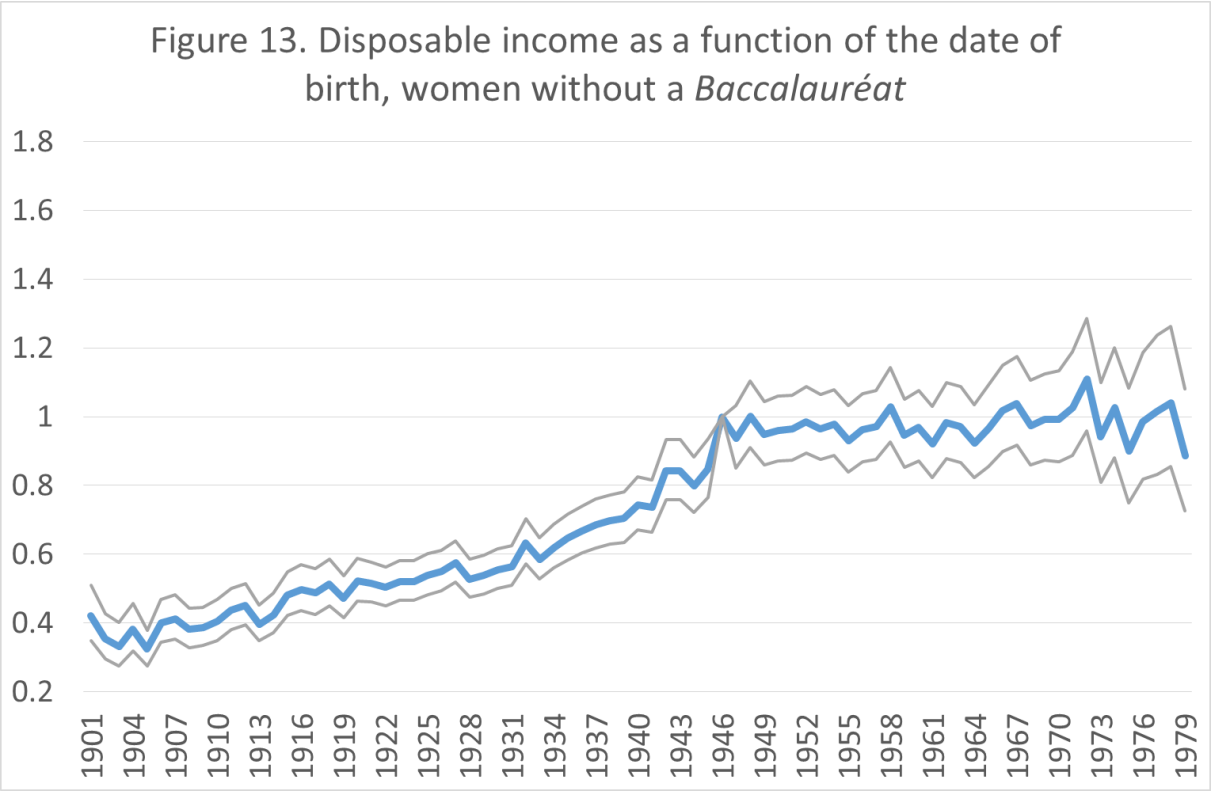

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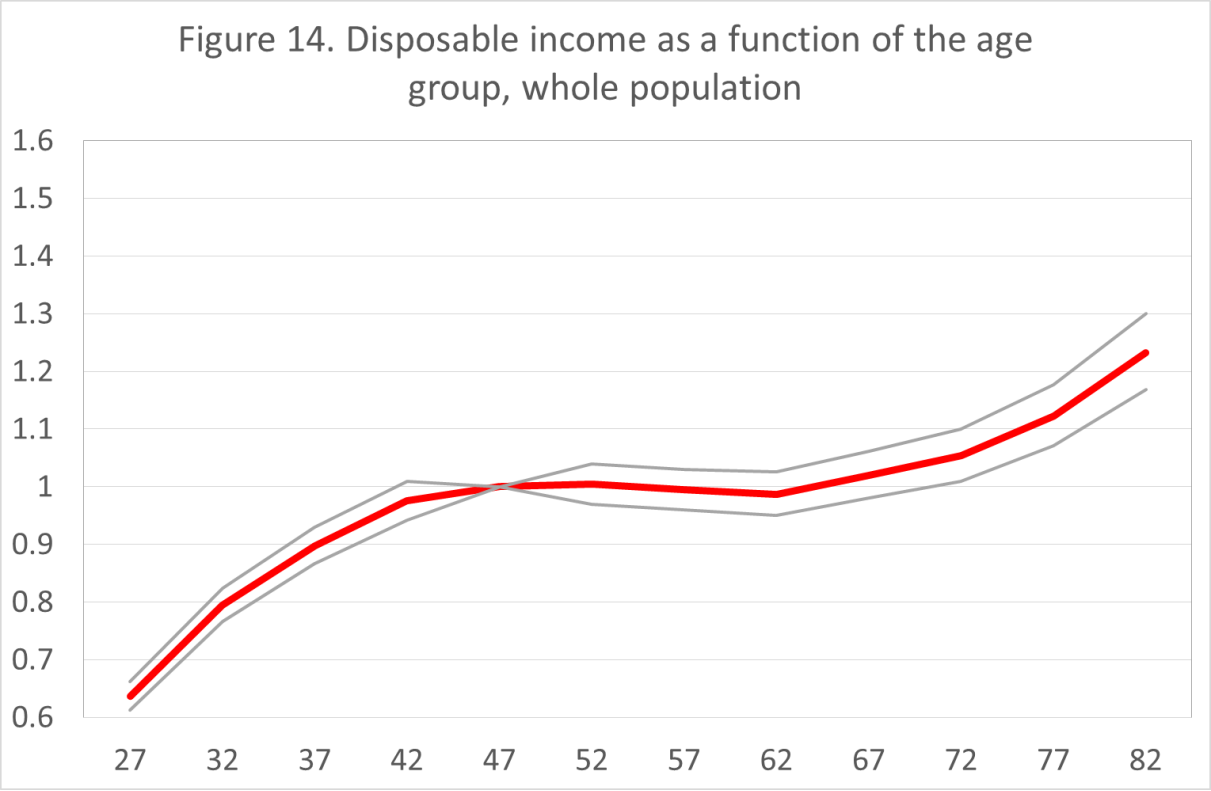

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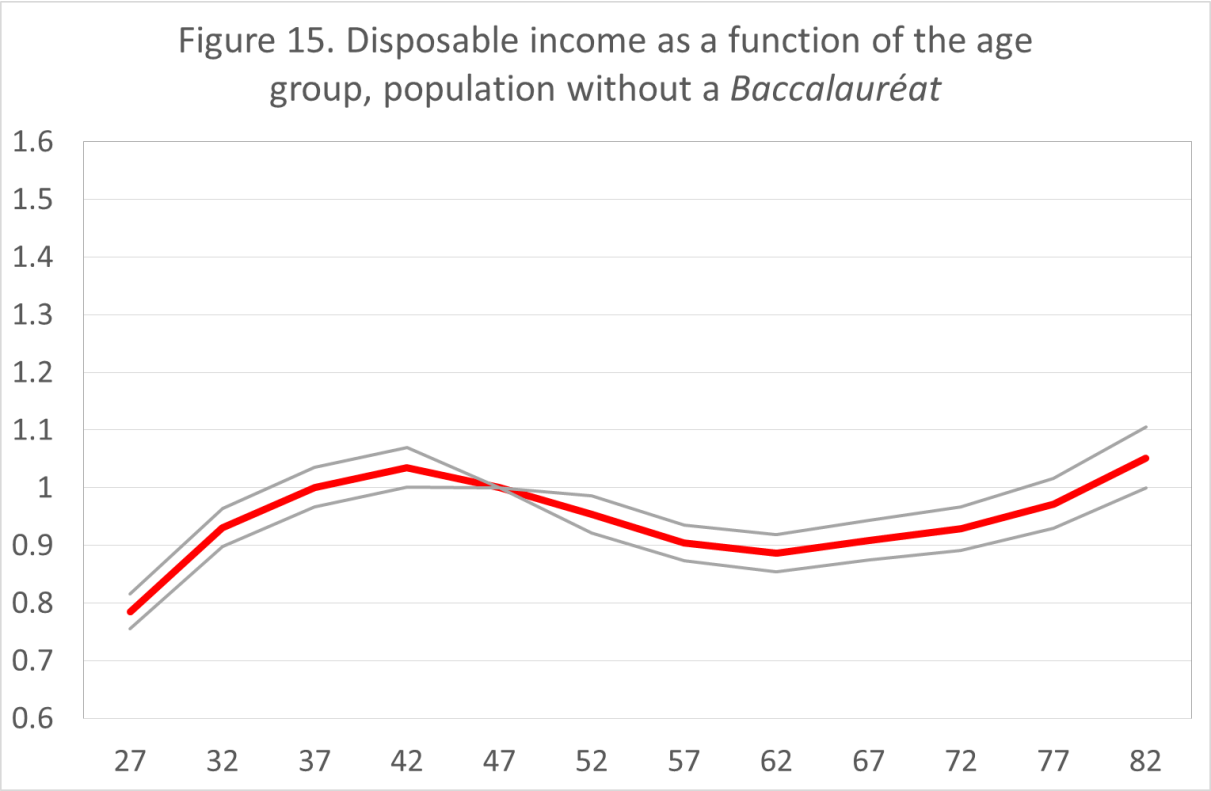

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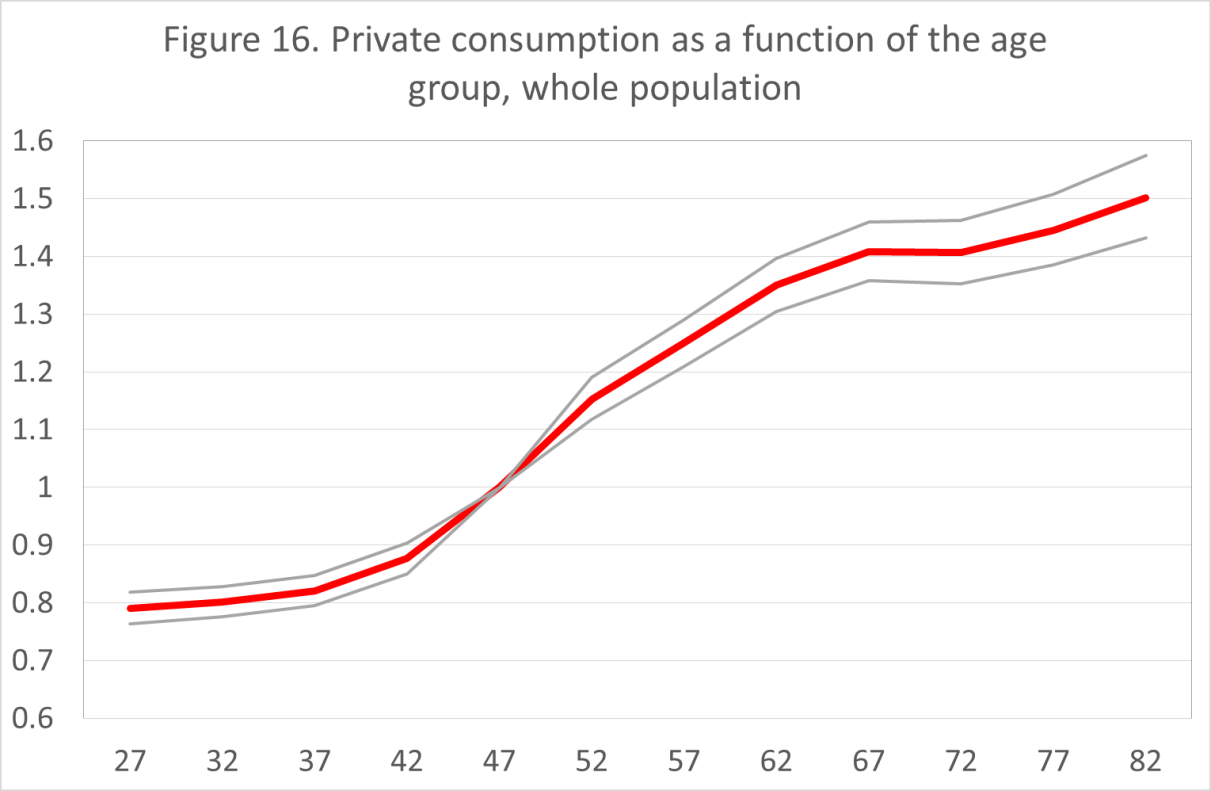

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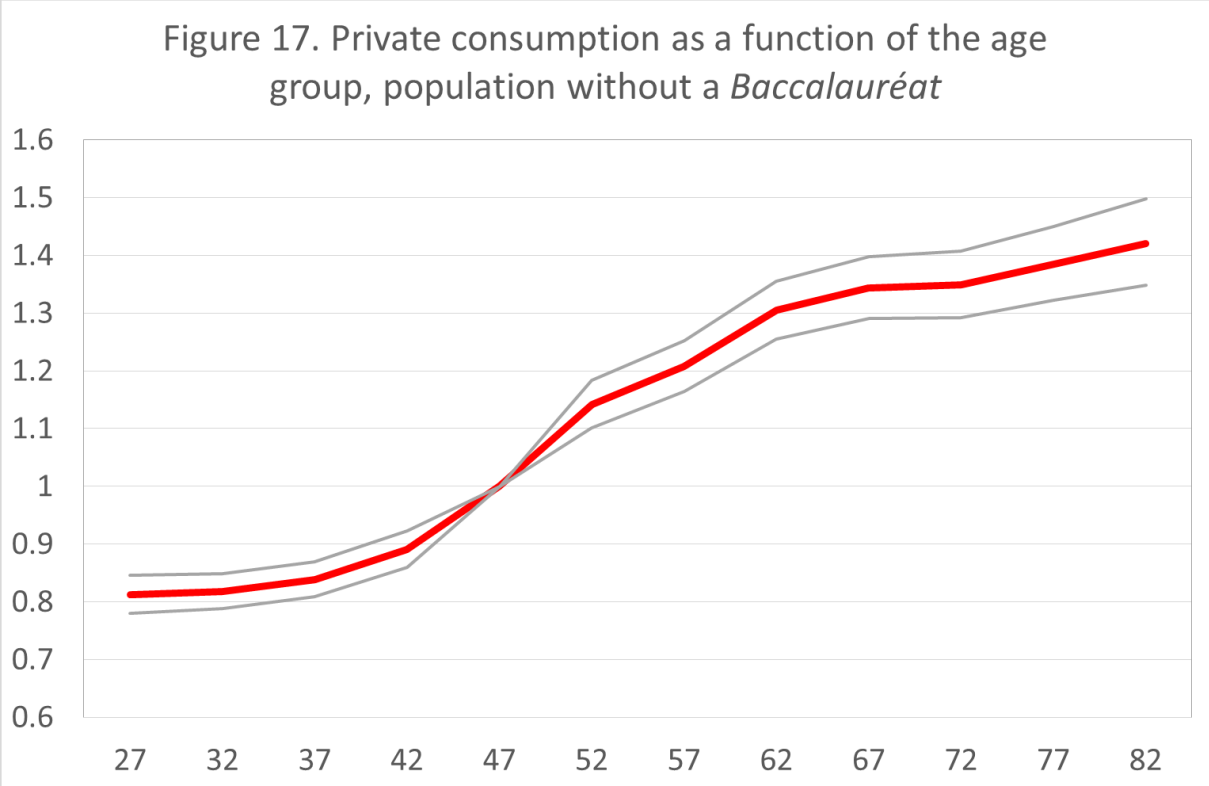

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