Increased longevity and social security reform: questioning the optimality of individual accounts when education matters

par [Gilles Le Garrec](#)

In 1950, life expectancy at birth in Western Europe was 68 years. It is now 80 years and should reach 85 by 2050. The downside of this trend is the serious threat that is hanging over the financing of our public retirement systems. Financed on a pay-as-you-go (PAYG) basis, *i.e.* pension benefits are paid through contributions of contemporary workers, the systems must cope with an increasingly large number of pensioners compared to the number of contributors. For example, leaving the average age of retirement unchanged in France would lead to a ratio of pensioners to workers (the dependency ratio) of 70.1% in 2040, whereas this ratio was 35.8% in 1990. Changes are unavoidable. Maintaining the current level of benefits within the same system in the near future requires to increase either the contribution rate or the length of contribution (by delaying the age of retirement).

This financing problem calls into question the role of PAYG retirement systems in our societies. For instance, by evaluating the real pre-tax return on non-financial corporate capital at 9.3% and the growth rate over the same period (1960 to 1995) at 2.6%, Feldstein[1] unequivocally advocates the privatization of retirement systems and a switch to fully funded systems. He assesses the potential present-value gain at nearly $20 trillion for the United States. However, beside

the change in the nature of the risk,[2] replacing conventional PAYG systems by financial — or funded — defined contribution (FDC) systems would certainly involve prohibitive social and political costs because one generation will have to pay twice. Implementing such a reform in Western democracies thus appears difficult. For that reason, in recent years a large focus has been put on non-financial — or notional — defined contribution (NDC) systems as legislated in Sweden in 1994. NDC systems are PAYG systems that mimic FDC systems. Individual contributions are noted on individual accounts. Accounts are credited with a rate of return that reflects demographic and productivity changes. Obviously, replacing conventional PAYG systems by NDC systems does not address the main concern of Feldstein, that is, the low return associated with the PAYG financing method. However, supporters of NDC systems claim that conventional systems, by linking pension benefits only partially to contributions, distort individual behaviours, inducing reduced work efforts or earlier retirements. In addition, they claim that only an explicit defined contribution system will be able to stabilize contributions in spite of aging populations.

Looking at the empirical facts, the supposed inefficiency of conventional retirement systems must be reconsidered. Firstly, even if their pension benefits are linked to partial earnings history, most conventional systems are close to actuarial fairness[3] as NDC systems because high-income earners live longer and have steeper age-earnings profiles. Secondly, stabilizing contributions can be achieved similarly within the scope of more conventional defined benefit systems, as seen in the "point system" in France or in Germany. In that case, the unit of pension rights is earnings points (not euros) and can be adjusted according to demographic and productivity changes, as in an NDC system. Cleverly designed conventional retirement systems can often do the same job as NDC systems. Finally,

empirical findings from Sala-i-Martin[4] and Zhang and Zhang[5] tend to support a positive impact of retirement systems on economic growth through the human capital channel.

To explain the positive link between PAYG retirement systems and economic growth that is suggested by the empirical findings, previous authors have then focused on the human capital channel, and more particularly on parental altruism. In this strand of the literature, PAYG retirement systems result in higher economic growth because they provide an incentive for altruistic parents to invest more in their children's education, even if investment per child remains insufficient to be socially optimal. In addition, they also provide an incentive for parents to have fewer children. In that context, when private behaviour is not observable, Cigno, Luporini and Pettini[6] show that a second-best policy would be to provide parents with subsidies linked to the number of children they have and their future capacity to pay taxes. To that end, Cigno[7] suggests that unconventional children-related pension systems be added to conventional retirement systems so as to allow individuals to earn a pension by raising children and by investing in their human capital. Introducing such an unconventional system could stimulate both fertility and economic growth. In France, the 10% bonus on pension benefits for parents of three children or more is such a pension-based fertility subsidy. However, for both reasons of economy and equity[8], these subsidies are taxed since the reform of 2013, with the risk of lowering the fertility incentives. This latter reform will imply more profound changes as from 2020 proportional subsidies will be replaced with payments only given to women on a per-child basis (the first child inclusive).

Beyond the impact of PAYG systems on parents' behavior, results have first appeared mixed when considering people investment in their own education. On the one hand, Kemnitz and Wigger[9] and Le Garrec[10] have shown that conventional

retirement systems provide an incentive for people to be trained longer because training results in steeper age-earnings profiles. On the other hand, Docquier and Paddison[11] have shown that in reducing the actualized return to education conventional retirement systems dissuade less able people from investing in their education. By embedding both channels, Le Garrec[12] shows that the positive impact dominates the negative one so that the average length of training and then economic growth was increased with conventional retirement systems, at least for low contribution rates. In the spirit of Cigno, this result suggests that a desirable feature of any retirement system would be to subsidize people who invest in their own education by linking pension benefits to the best — or last — years' average annual earnings, not to full lifetime average earnings as in NDC systems. From that perspective, the Balladur reform of 1993 inFrance went in the wrong direction. Indeed, in the private sector earnings-related benefits were linked to the ten best years before the reform, then gradually to the 25 best years after.

Starting from the empirically supported assumption that conventional retirement systems are close to actuarial fairness and yield more economic growth, it is then not straightforward to determine whether the introduction of individual accounts and the stabilization of contributions are desirable objectives. To analyze this issue and the relevancy of the switch from conventional unfunded public pension systems to notional systems we have extended in a recent article[13] the social security-growth literature in two directions. First, following Le Garrec (2012), we consider investment in human capital through both the proportion of individuals who decide to invest and the time they invest. With more general specifications, we can provide explicit and general conditions so that the positive effect associated with

the lengthening of training may be dominated by the negative effect, *i.e.* the decrease in the proportion of educated individuals. We then show that economic growth may exhibit an inverse U-shaped pattern with respect to the size of an actuarially fair retirement system in which pensions are linked to the best — or last — years' average annual earnings, while an NDC system has no impact on economic growth. Second, we consider the aging process, not by assuming decreased fertility as it is usually done in the literature, but through increased longevity. This has important consequences. Indeed, as increased longevity raises the value of investments that pay over time, it generates stronger incentives for people to invest in their education[14]. Therefore, social security interacts with longevity in determining the individual level of investment in education. We then show that increased longevity may raise the size of the conventional retirement system rate that maximizes economic growth.

For policy-making, the message in Le Garrec (2014) is clear: increased longevity should be associated with an increase in the size of the existing conventional retirement systems, not with a switch towards NDC systems. However, there is no guarantee that the political process leads to the optimal size. According to Browning[15], there even are good reasons to think that the political process leads to a PAYG size exceeding the growth-maximizing level. Indeed, he showed that workers tend to increase their support for the PAYG retirement system as they approach retirement. Consequently, considering that the pivotal voter is middle-aged worker, by definition closer to retirement than a young worker, this could strengthen support for a PAYG size that exceeds the growth-maximizing (or the welfare-maximizing) level. Does this mean that in practice an NDC system is preferable to a conventional system? Not necessarily. Indeed, an assessment that the conventional PAYG size exceeds the growth-maximizing level does not necessarily mean that an NDC system would allow greater economic growth. Quite the opposite, if we give

credence to the empirical results reported by Sala-i-Martin (1996) and Zhang and Zhang (2004), economic growth would be slowed down when switching to an NDC system.

Starting then from a situation where conventional PAYG systems yield more economic growth, what may happen with increased longevity. Firstly, as the pivotal voter approaches retirement, it is likely that the PAYG size supported by a majority will increase. Two configurations may then occur. If the effective PAYG size increases less or only slightly more than the growth-maximizing level, the superiority of a conventional system over an NDC system may be preserved. In that case, a switch towards NDC systems will not be optimal. By contrast, if the effective PAYG size increases significantly more than the growth-maximizing level, conventional retirement systems may become harmful for economic growth. In that case, as suggested by Belan, Michel and Pestieau[16], a Pareto-improving transition towards a fully funded system may exist if it results in a significant increase in economic growth. More likely, if such a transition does not exist, a switch to NDC systems can then be considered as a desirable policy for increasing economic growth and social welfare.

In Le Garrec (2014), all the solutions coping with increased longevity have been considered while keeping the calculation of pension benefits actuarially fair. If the main problem of existing retirement systems is that they are too large, another solution would be to make the system more progressive. Indeed, as highlighted by Koethenbuerger, Poutvaara and Profeta[17], the size of the retirement system chosen by the median voter tends to decrease as the link between contributions and benefits is loosened. It is a fact that progressive systems appear smaller than actuarially fair systems. However, as argued by Le Garrec[18], more progressivity also leads to fewer incentives for people to

invest in their education. At this stage, the impact of introducing more progressivity on economic growth appears uncertain, unless it also strengthens majority support for public education funding, as argued by Kaganovich and Meier[19]. From that perspective, incorporating public education in the analysis appears to be a promising avenue for further research.

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[1] "The missing piece in policy analysis: Social security reform", *American Economic Review*, 1996 (86-2), pp. 1-14.

[2] The risk is linked to the instability of financial markets in FDC systems while it is linked to the forecast of the correct evolution of the dependency ratio in PAYG systems. In the latter, there is also a kind of political risk as transfers go from a majority, the workers, towards a minority, the pensioners.

[3] Except in Anglo-Saxon countries where pensions are weakly related to earnings. Strictly speaking, a retirement system is said actuarially fair if its return is equal to the interest rate. Considering that the economic growth rate, which is the retirement system return, is lower than the interest rate, retirement systems could be described more properly as quasi-actuarially fair.

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[6] "Transfers to families with children as a principal-agent problem", *Journal of Public Economics*, 2003 (87), pp.

1165-1172.

[7] "How to avoid a pension crisis: a question of intelligent system design", *CESifo Economic Studies*, 2010 (56), pp. 21-37.

[8] The measure costs 5.7 billions Euros according to the Moreau report in 2013. In addition, as subsidies are proportional, they benefit more high-income earners and consequently also men.

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[13] Le Garrec G. (2014), "Increased longevity and social security reform: questioning the optimality of individual accounts when education matters", *Journal of Population Economics*, DOI:10.1007/s00148-014-0522-z.

[14] This issue is well documented in the literature. See for example Cervellati M. and Sunde U. (2005), "Human capital, life expectancy, and the process of development", *American Economic Review*, 95(5), pp. 1653-1672.

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[17] "Why are more redistributive social security systems

smaller? A median voter approach", *Oxford Economic Papers*, 2007 (60), pp. 275-292.

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[19] "Social security systems, human capital, and growth in a small open economy", *Journal of Public Economic Theory*, 2012 (14-4), pp. 573-600.

Social inequality in the face of death*

By [Gilles Le Garrec](#)

The problem of inequality in the face of death has become an important topic in French public discourse in recent times, in particular in autumn 2010 during debate about raising the minimum legal retirement age by two years, by gradually shifting it from age 60 to 62. The debate became focused around a politically divisive issue: should the retirement age remain unchanged for low-skilled workers on the grounds that they enter the labour market earlier and / or have more strenuous jobs and live shorter lives? Since the socialist government came to power in 2012, two exemptions have been introduced to allow less-skilled workers to continue to retire at 60. First was the introduction in summer 2012 of an exception for a "long career", that is to say, for those who have contributed for a sufficiently long time. This September 2013 it has also been decided to set up a "hardship" account, starting in 2015, which will allow all employees who are exposed to working conditions that reduce their life expectancy to retire earlier. Nevertheless, the issue of

inequality in the face of death — a taboo subject? — involves much more than simply the retirement age; before that, there are also the issues of inequality in income, housing, access to employment, education, etc. What follows is a small panorama (statistical) on inequality in the face of death in France, its causes and the difficulty of developing a political solution due to the multidimensional factors involved.

Very old — but not very reliable — statistics

From the late 18th century [1], the development of censuses, which was associated with the rise of statistics, has made it possible to build up data that show the existence of a close link between inequality in the face of death and social inequality more generally. These early studies show that inequality in the face of death is explained primarily by income (Cambois, 1999). However, the import of these studies is limited due to the low reliability of their data and methodology. It is no easy matter to develop reliable indicators on this issue. Once we have the socio-professional categories (SPC) for death statistics and censuses, we can easily calculate mortality rates by comparing the number of deaths for the year (or years) classified by SPC with the size of the population classified in the same way. For example, in France for the period 1907-1908 Huber catalogued on an annual basis the death of 129 business executives aged 25 to 64 out of a total of 10,000, compared with 218 workers. This simple and intuitive method nevertheless gives a distorted view of social inequality in the face of death, due to incompatibilities between population data and mortality data (Desplanques, 1993). The difficulty of obtaining an accurate representation of inequalities in the face of death becomes especially difficult with this method, as there is a growing trend for career paths to fragment, with alternating periods of activity and unemployment.

The longitudinal method and its lessons

To overcome this problem, France's INSEE has developed a longitudinal method that consists of regularly monitoring a group of individuals who have particular characteristics at a given point in time, and ultimately the date of their death. The permanent population sample thus obtained, which was initialized during the census of 1968, currently includes approximately 900,000 individual histories, ensuring a good representation of the French population ([Couet, 2006, for a description of this sample and how it was constructed](#)). This large-scale socio-demographic panel makes it possible to draw a relatively accurate picture of social inequality in the face of death in France. This shows that individual lifetime varies greatly from one socio-professional category to another, especially among men (Table 1). Male executives have a life expectancy (at age 35) that is four to five years above the average for men. Excluding inactive people [2], the most disadvantaged groups are manual workers, followed by white-collar employees, with life expectancies that are, respectively, two years and one year less than the average. Another interesting point is that the overall gain of four years in life expectancy over the period did not reduce inequalities in the face of death. The relatively stable result is that at age 35 the life expectancy of manual workers is six to seven years less (and white-collar employees five to six years less) than that of corporate executives and managers. In addition, at age 35 on average the latter experience 34 years in good health [3], 73% of their life expectancy, against 24 years for manual workers, or 60% of their life expectancy ([Cambois *et al.*, 2008](#)). While among women, the difference in life expectancy between managerial personnel and manual workers was "only" three years at the time of the last census, the differences are comparable with those for men in terms of life expectancy in good health. The conclusion is clear: numerous social inequalities persist in the face of death, including in terms of health. This conclusion holds for every country in Western Europe that has conducted this kind of study, although it should be noted that

the level of inequality in France appears to be the greatest by far (Kunst *et al.*, 2000). The ratio of "manual to non-manual mortality" in France was 1.71 for men age 45-59, whereas it is on the order of 1.35 in most other countries (Finland, second behind France in terms of inequality, is 1.53). Leaving aside issues of data comparability, alcohol consumption is, according to Kunst *et al.* (2000), the most important factor behind the specific situation of France. Indeed, the greatest inequalities in mortality in France are due to major differences in mortality due to liver cirrhosis and to cancer of the aerodigestive tract, both of which are associated with excessive alcohol consumption.

Table. Life expectancy of men and women at age 35, By period and socio-professional category

In years

Socio-professional category	Life expectancy at age 35			Difference with the average			Life expectancy at age 35			Difference with the average		
	1983-1991	1991-1999	2000-2008	1983-1991	1991-1999	2000-2008	1983-1991	1991-1999	2000-2008	1983-1991	1991-1999	2000-2008
	Men						Women					
Executives/managers	43,7	45,8	47,2	+4,5	+5	+4,4	49,7	49,8	51,7	+3,3	+1,8	+2,3
Intermediary profession	41,6	43,0	45,1	+2,4	+2,2	+2,3	48,1	49,5	51,2	+1,7	+1,5	+1,8
White collar employee	38,6	40,1	42,3	-0,6	-0,7	-0,5	47,4	48,7	49,9	+1	+0,7	+0,5
Manual worker	37,3	38,8	40,9	-1,9	-2	-1,9	46,3	47,2	48,7	-0,1	-0,8	-0,7
Inactive, not retired	27,5	28,4	30,4	-12,7	-12,4	-12,4	45,4	47,1	47,0	-1,0	-0,9	-2,4
Total	39,2	40,8	42,8	-	-	-	46,4	48,0	49,4	-	-	-

Source : Blanpain (2011), based on data from the permanent demographic sample, INSEE.

The causes

Several factors have been identified to explain the difference in mortality between socio-professional categories.

First, one can easily imagine that the working conditions of manual workers are usually physically demanding and debilitating. Moreover, during the 1980s we have seen a transformation in the structure of unskilled jobs. Over this period, the increasing need for businesses to be highly responsive has led to a more widespread use of flexible and precarious forms of employment (short-term contracts; atypical schedules; development of part-time, temporary work, etc.). But the increasingly precarious nature of work, which affects low-skilled jobs above all, is contributing to a serious

deterioration in working conditions. Global economic conditions may therefore play a part in explaining disparities in mortality. In any event, working conditions are not improving as quickly for manual workers as for managers. This is certainly the view that was advocated in establishing the "hardship" account that is to be implemented from 2015. So any private sector employee who is exposed to working conditions that reduce life expectancy will accumulate points that will, among other things, enable them to retire early, and potentially before the statutory threshold of 62.

It should also be noted that the most disadvantaged groups cumulate a number of risky behaviours, such as smoking, excessive alcohol consumption, poor diet and a sedentary lifestyle. In contrast, managers and the intermediate professions smoke and drink in moderation. As was already pointed out as a factor in France's poor results in Western Europe (Kunst *et al.*, 2000), these differences in behaviour show up clearly in the mortality rates associated with certain diseases. The risk of death due to a tumour in the aero-digestive tract (larynx, pharynx, lungs, oesophagus, liver) is especially high among manual workers, and is at the heart of a significant portion of the observed differences in mortality. For example, during the 1980s, among men aged 45 to 54, the mortality rate associated with a tumour of the pharynx was 11 times higher for skilled workers and labourers than for teachers and the intellectual professions (Desplanques, 1993).

A lack of access to healthcare for the most disadvantaged groups is another explanation offered for the disparities in mortality, first of all because of costs. Mormiche (1995) thus shows that the consumption of medical products (their quantity but also their nature) is highly dependent on income. Disparities in access to healthcare are particularly marked for care that is expensive or poorly covered (especially dental). Herpin (1992) points out that a reduction in income due to a loss of employment leads to an almost proportional

reduction in consumer spending, including on health. The risk of death rises by 60% for unemployed men in the years following a job loss ([Mesrine, 1999](#)). A man in poor health is of course more likely to be unemployed, but unemployment, due to the development of financial stress and disorientation and to personal factors, may affect health by creating a physical and emotional distance with respect to obtaining care.

Finally, the social environment and the local context play an important role in the persistence of social inequalities in the face of death, as can be seen in Table 1. The idea that the behaviour of individuals is influenced by their place of residence has been developed in an extensive literature in the fields of both sociology and psychology ([Roberts and DelVecchio, 2000](#)). Mechanisms through which children identify with the behaviour of the adults surrounding them highlight a collective type of socialization. However, socio-spatial polarization, which is characterized by the creation of urban areas that cumulate all sorts of social disability, has been steadily increasing since the 1980s in France ([Fitoussi *et al.*, 2004](#)). In these neighbourhoods, the high level of concentration of groups characterized by risky behaviours may, through this process of identification, root these behaviours in the core of people's lifestyle. This phenomenon may explain why prevention policies among high-risk populations are ineffective. The financial difficulties that are giving rise to the under-utilization of medical facilities can also wind up leading to social distancing from health issues. The weak participation of women from disadvantaged strata in public programmes to screen for breast cancer is illustrative of this. Moreover, even in countries where there is effective universal health coverage, the differences in the consumption of healthcare persist.

What should we conclude?

Social inequality in the face of death is a sensitive issue. At the heart of this problem lie a multitude of more or less

overlapping causes. To be effective, policies to combat this type of inequality must grasp them as components of an ensemble, with interactions throughout their economic, social and spatial dimensions. While awaiting the reduction of these larger inequalities, it would seem worthwhile to establish just social policies that take account of this inequality in the face of death. In this regard, setting up a "hardship" account that enables any employee who is exposed to working conditions that reduce their life expectancy to retire earlier is definitely a step in the right direction. Nevertheless, the establishment of criteria is not as easy as it seems. Indeed, it is clear that a good share of social inequality in the face of death can be explained by risky behaviour. Some might reason that such behaviours are an expression of individual freedom and that it is not up to society to compensate for the consequences. Or, it could be argued, to the contrary, that these behaviours are a response to psychosocial stress caused by, among other things, difficult working conditions. From this perspective, the compensation represented by an earlier retirement would seem more equitable. But it is not certain that we can really distinguish these two cases. You can bet that the future definition of the criteria for accumulating points to meet the "hardship" criteria giving entitlement to early retirement will be the subject of lengthy negotiations….

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[1] Pioneering works that could be cited include those by Moheau (1778) and Villermé (1840).

[2] A category that groups individuals who have never worked. For women, this means mainly "housewives".

[3] Good health is defined by the absence of limitations on everyday activities and the absence of incapacity.