Pension reforms in an unequal ageing population

Alexia Prskawetz[1,2,3], Miguel Sánchez-Romero[1,2,3], and David Zettler[2]

[1]Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/OeAW, University of Vienna), VID, Vienna, Austria
[2]Research Group Economics, Institute of Statistics and Mathematical Methods in Economics, Vienna University of Technology, Vienna, Austria
[3]International Institute for Applied Systems Analysis (IIASA), Schlossplatz 1, Laxenburg 2361, Austria

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Abstract

As the heterogeneity in life expectancy by socioeconomic status increases, many pension systems imply a wealth transfer from short- to long-lived individuals. Various pension reforms aim to reduce inequalities that are caused by ex–ante differences in life expectancy. However, these pension reforms may themselves induce redistribution effects. We plan to implement a dynamic General Equilibrium-OLG model populated by heterogeneous individuals that differ by gender, education, family size, labor supply, health status, and life expectancy. Within this framework, we will study how different socioeconomic groups respond to various pension reforms and analyze the resulting redistribution effects across these groups.

1. Motivation

Many studies have shown a widening of the difference in life expectancy between high and low SES groups in recent decades. One implication of this demographic trend is that pension systems become more regressive. Through risk pooling, low SES groups unexpectedly subsidize the pension benefits of high SES groups, since individuals who have on average a higher life expectancy receive their benefits for more years compared to those who have a low life expectancy. Thus, besides the necessity of pension reforms to cope with the increasing life expectancy at retirement and the long-run sustainability of pension funding, policy makers also need to consider that individual aging is heterogeneous across SES groups. Reforms need to counteract the increasing regressivity of pension systems.

In this paper we will study the redistributive properties of various pension reforms not just at the time of retirement but over the whole lifecycle. We will also consider how different birth cohorts are affected by the reforms.

2. Methodology

To take into account the complexity of modeling the variance in life expectancy across socioeconomic groups we will set up a dynamic general equilibrium model with a heterogeneous population by gender, education, family size, labor supply, health status, and life expectancy. Individuals will (endogenously) choose their educational attainment, based on their initial endowments of their

schooling effort and innate learning ability, two characteristics that represent the unobserved heterogeneities in our population. Using data from Wittgenstein Centre for Demography and Global Human Capital 2018, we will link mortality and fertility to the education decision of individuals.

Given a specific educational attainment, agents will choose at each age the consumption of the household, home production, their health spending, their labor supply (paid and unpaid) and their retirement age. Additionally, agents will face uncertainty with respect to their health status and, while in the labor market, their employment status. Thus, agents will save for two reasons: i) they will save for retirement motive, in order to afford consuming during retirement, and ii) for precautionary reasons, in order to create a buffer stock that may help compensating future health and employment shocks. Agents will accumulate pension points in the public pension system that may partly offset savings for retirement and precautionary reasons. Figure 1 provides a visual representation of the timeline of an agent in our model.

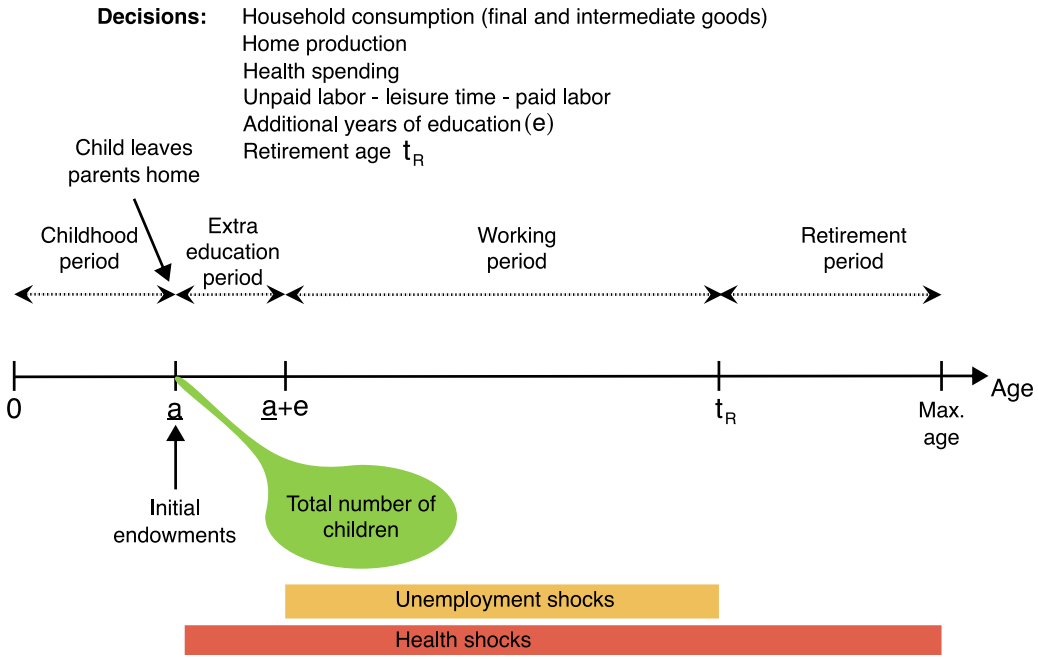


Figure 1: Agents' timeline

The model will be structurally calibrated to replicate the educational distribution and the income distribution of several European countries. The calibration will be done applying the Bayesian melding method (Poole and Raftery 2000). Within our model framework we will then study how different pension reforms may induce a redistribution across different SES groups.

The model will be implemented with economic and demographic data from various sources, including SHARE, EU-SILC, National (Time) Transfer Accounts, National accounts, WIC Human Capital Explorer, Eurostat, and others, for a specific group of European countries.

3. Preliminary results

Thus far we have applied the model without home production and considering that agents were not facing risks in health, employment, and family size (Sánchez-Romero et al. 2023). In this model

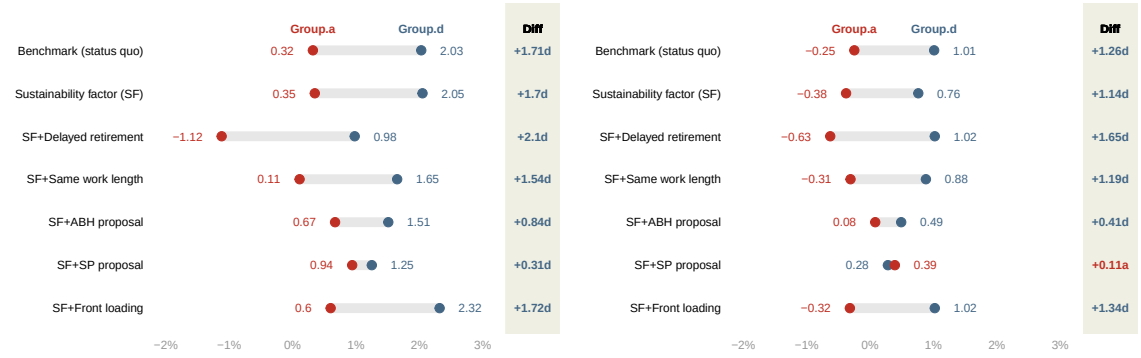
we studied six alternative pension reforms to the Austrian pension system (benchmark). In the first reform (reform 1) we included a sustainability factor (SF). We also implemented a reform that accounts for a delay in the retirement age (reform 2) and a reform that aims at the same working length across the population (reform 3). In a further reform we implemented the proposal by Ayuso et al. 2017, that recommends adjusting the pension replacement rate of each retiree according to the difference between the remaining years-lived of the population subgroup of the retiree and that of the average retiree (reform 4). With this proposal, it is expected that at the age of retirement all retirees will earn the same present value of benefits relative to the contributions paid. We continued with a reform by Sánchez-Romero and Prskawetz 2020 that suggests to find the level of progressivity in the replacement rate such that the pension program is ex-ante neither regressive nor progressive for any population subgroup (reform 5). The last reform we proposed follows the recent literature, e.g. Vandenberghe 2022, that implements a front loading benefit scheme (reform 6).

To compare the results we have obtained for the various pension reforms, we first present the effect of each reform on selected macro variables (output per capita, the pension cost-to-output ratio and the total pension wealth-to-output ratio) for the years 2030, 2040, 2050 and 2060. To examine the redistributive properties of each pension reform, we utilize alternative indicators such as the internal rate of return (IRR) of the pension system. We report all indicators for two distinct population groups that differ by educational attainment, labor income and life expectancy and for two birth cohorts (1980, 2020).

Table 1: Macroeconomic impact of pension reforms (mean values)

	Output per capita (Year 2010=100)				Pension cost-to-output (in %)				Total pension wealth-to-output (in output years)			
Year	2030	2040	2050	2060	2030	2040	2050	2060	2030	2040	2050	2060
Pension reform	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
0. Benchmark (status quo)	149	176	208	236	18	20	18	19	10.3	10.0	9.7	9.8
1. Sustainability factor (SF)	149	176	208	235	18	20	18	19	10.2	9.9	9.6	9.6
Absolute difference with respect to status quo												
1. Sustainability factor (SF)	0	0	0	-1	0	-1	0	0	-0.1	-0.1	-0.2	-0.2
Absolute difference with respect to sustainability factor												
2. SF + Delayed retirement	2	7	11	20	-2	-4	-5	-7	-2.2	-2.4	-2.5	-2.5
3. SF + Same work length	-2	0	1	3	0	-1	-2	-2	-0.2	-0.3	-0.2	-0.1
4. SF + ABH proposal	-1	-1	-2	-1	0	0	0	-1	0.0	-0.1	-0.1	-0.1
5. SF + SP proposal	-2	-3	-4	-3	0	0	0	-1	0.0	0.0	0.0	0.0
6. SF + Front loading	-1	0	-3	-3	1	0	2	1	0.7	0.7	0.7	0.7

Our preliminary results, presented in Table 1 and Figure 2, show that a pension reform involving a delayed retirement age and a sustainability factor (referred to as pension reform 2) yields the most favorable macroeconomic outcomes when compared to the current Austrian pension system. This reform leads to an increase in output per capita, while reducing the ratio of pension cost-to-output and the total pension wealth-to-output. However, it does increase inequality among socioeconomic groups (c.f. internal rate of return (IRR) between the benchmark and reform 2 in Figure 2). The other pension reforms implemented generally have less favorable effects on output per capita. Nevertheless, they manage to keep pension costs and pension wealth lower, at least in comparison to the current Austrian pension system. Another important result is that the reforms aiming to address differences in years worked or life expectancy tend to reduce inequality, while a front-loading pension benefit scheme (reform 6) increases inequality (see Figure 2).



(a) **Birth cohort 1980** (b) **Birth cohort 2020**

Figure 2: IRR - expected rate of return received from contributing ot the pension system Notes: (**Group.a**) low learning ability and high schooling effort or lowest SES group, (**Group.d**) high learning ability and low schooling effort or top SES group

4. Future and ongoing work

We are currently finishing the extension of the model to include home production, allowing us to capture the empirically observed impact of children by gender, as well as to the differential risk in health and unemployment faced by individuals with different educational attainment.

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