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Social security and economic integration

L. Artige [a,b], A. Dedry [a,b], P. Pestieau [b,a,c,d,*]

[a] HEC, University of Liège, Belgium
[b] CREPP, Belgium
[c] CORE, University of Louvain, Belgium
[d] TSE, France

HIGHLIGHTS

- Early retirement can induce more capital accumulation than flexible retirement.
- Early retirement can partly compensate for the depressive effects of PAYG pensions on saving.
- With international capital mobility capital can flow from countries with early retirement to those with flexible retirement.

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ABSTRACT

This letter analyzes the impact of economic integration on capital accumulation and capital flows when countries differ in their social security systems. Funding and early retirement both foster capital accumulation relative to pay-as-you-go pensions with flexible retirement. When economies integrate, both imply capital outflow possibly resulting in utility losses.

1. Introduction

It is a well known fact that economic integration can have unpleasant implications for countries which are relatively less indebted than others. Whether the debt concerned is the traditional sovereign debt or that which is implicit to unfunded pension schemes, free capital mobility leads to capital outflow from countries enjoying sound public finances to indebted ones. This consideration justified the criteria set out in the Maastricht Treaty of the European Union: a deficit of less than 3% and a debt to GDP ratio not exceeding 60%. Interestingly, the Maastricht Treaty did not consider the other – less explicit – forms of indebtedness. For, beside indebtedness, there are other national characteristics having similar implications but getting less attention. One of these is the degree of flexibility regarding the retirement age. There exist a wide variety of regulations concerning retirement across OECD countries[1] resulting in significant variation in the effective age of retirement.[2] This situation has implications as regards saving and capital accumulation. The life cycle theory of saving is explicit enough: the later individuals retire, the less they have to save. Someone willing and allowed to work till the end of his life will need to save much less than someone either induced or forced to retire around 55, which is frequently the case in countries such as France or Belgium.

This paper examines the role of two features of retirement systems with regard to economic integration: whether pension is

* Corresponding author. Tel.: +32 4 366 31 09.
E-mail address: p.pestieau@ulg.ac.be (P. Pestieau).

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[1] See Fenge and Pestieau (2005).
[2] Gruber and Wise (1998).

funded or not and whether it comprises flexible or early retirement age. The impact of funding has been widely studied.[3] It is largely equivalent to that of public debt in an economic union. On the other hand, the effect of early versus flexible retirement has received little attention in the literature. Using an overlapping generations model (OLG) in the steady state, we show that (1) early retirement incites individuals to save more for their old age and (2) both a PAYG pension system and a flexible retirement age imply an inflow of capital from countries with fully funded pensions and early retirement. As the contrast between early and flexible retirement is at the heart of this letter, a word of explanation is in order at the outset. One generally distinguishes three definitions for the retirement age: the optimal or flexible age – which is the age at which individuals would choose to retire if they were subject to no distortion –, the statutory age (also called pensionable age) – which is the age at which they are expected or required to cease work and become entitled to full pension benefits –, and last, the effective age of retirement—which generally is below both the statutory and the optimal age of retirement. As argued by Gruber and Wise (1998, 2004), people are induced to retire before the optimal and statutory age through an array of incentives working out as an implicit tax on prolonged activity. In what follows, the terms (induced) early age and effective age are used indifferently as this age is the result of explicit policies aimed at lowering the age of retirement relative to the statutory level. In most countries studied by Gruber and Wise,[4] the statutory age of retirement is 65 while the effective age is far below that. Using the implicit tax which they estimate for each country yields a rough idea of the optimal age of retirement. As long as the implicit tax is positive, one knows that the effective age, which we call the early age of retirement, is below the optimal age of retirement.[5]

2. The basic model: autarky

We use the standard overlapping generations model. An individual belonging to generation t lives two periods t and $t+1$. The first one has a unitary length while the second has a length $\ell \leq 1$, where ℓ reflects variable longevity. In the first period, the individual works and earns w_t which is devoted to the first-period consumption, c_t, saving s_t and the lump-sum pension contribution τ. In the second period he chooses an amount of labor time $z_{t+1} \leq \ell \leq 1$ and earns $z_{t+1}w_{t+1}$. This earning plus the proceeds of saving $R_{t+1}s_t$ and the PAYG pension p finance second period consumption d_{t+1}. Working z_{t+1} implies a monetary disutility $v(z_{t+1}, \ell)$ where $\frac{\partial v}{\partial \ell} < 0$ reflects the idea that an increase in longevity fosters later retirement. The parameter τ measures the relative size of the unfunded pensions. In other words, $\tau = 0$ implies that the whole pension system is funded.

For simplicity's sake, we use simple functional forms: logarithmic utility for c and d and quadratic disutility for $z : z^2/2\gamma\ell$, where γ is a preference parameter. We can now write the problem of the individual belonging to generation t. It amounts to maximize:

$$U_t = \ln(w_t - \tau - s_t) + \beta\ell \ln\left(\frac{R_{t+1}s_t + w_{t+1}z_{t+1} - z_{t+1}^2/2\gamma\ell + p_{t+1}}{\ell}\right) \quad (1)$$

where $p_t = \tau(1+n)$.[6] The FOC's with respect to z_{t+1} and s_t yield

$$z_{t+1} = z_{t+1}^* = \gamma\ell w_{t+1} \quad (2)$$

$$s_t = \frac{\beta\ell}{1+\beta\ell}w_t - \frac{\gamma\ell w_{t+1}^2}{2(1+\beta\ell)R_{t+1}} - \tau\left(\frac{\beta\ell}{1+\beta\ell} + \frac{1+n}{(1+\beta\ell)R_{t+1}}\right). \quad (3)$$

Alternatively, we can have an induced early age of retirement $\bar{z}$, with $\bar{z} < z_{t+1}^*$, i.e. workers are made to work less than they would choose with perfect flexibility. In this case, we rewrite Eqs. (2) and (3) as follows:

$$z_{t+1} = \bar{z} \quad (4)$$

$$s_t = \frac{\beta\ell}{1+\beta\ell}w_t - \frac{\bar{z}}{(1+\beta\ell)R_{t+1}}(w_{t+1} - \bar{z}/2\gamma\ell) - \tau\left(\frac{\beta\ell}{1+\beta\ell} + \frac{1+n}{(1+\beta\ell)R_{t+1}}\right). \quad (5)$$

We now turn to the production side. We use a Cobb–Douglas production function

$$Y_t = F(K_tL_t) = AK_t^{\alpha}L_t^{1-\alpha} \quad (6)$$

where the labor force is $L_t = N_t + N_{t-1}z_t = N_{t-1}(1+n+z_t)$, K_t is the stock of capital and A is a productivity parameter. We distinguish L_t the labor force and N_t the size of generation t. We assume that

$$N_t = N_{t-1}(1+n)$$

where n is the fertility rate. Denoting $K_t/L_t \equiv k_t$ and $Y_t/L_t \equiv y_t$, we obtain the income per worker (and not per capita):

$$y_t = f(k_t) = Ak_t^{\alpha},$$

and the factor prices

$$R_t = \alpha Ak_t^{\alpha-1}$$

$$w_t = (1-\alpha)Ak_t^{\alpha}.$$

The equilibrium conditions in the labor and capital markets are respectively

$$L_t = N_{t-1}(1+n+z_t)$$

$$K_{t+1} = N_t s_t.$$

We can now write the dynamic equation with perfect foresight for the capital accumulation when z is chosen optimally:

$$(1+n+z_{t+1})k_{t+1} = s_t \quad (7)$$

i.e.,

$$(1+n)k_{t+1} + \gamma\ell(1-\alpha)Ak_{t+1}^{1+\alpha} = \frac{\beta\ell}{1+\beta\ell}(1-\alpha)Ak_t^{\alpha} - \frac{\gamma\ell(1-\alpha)^2A^2k_{t+1}^{1+\alpha}}{2\alpha A(1+\beta\ell)} - \tau\left(\frac{\beta\ell}{1+\beta\ell} + \frac{(1+n)k_{t+1}^{1-\alpha}}{\alpha A(1+\beta\ell)}\right). \quad (8)$$

When $z = \bar{z}$, the dynamic equation becomes

$$(1+n+\bar{z})k_{t+1} = \frac{\beta\ell}{1+\beta\ell}(1-\alpha)Ak_t^{\alpha} - \frac{\bar{z}k_{t+1}^{1-\alpha}}{\alpha A(1+\beta\ell)}\left((1-\alpha)Ak_{t+1}^{\alpha} - \bar{z}/2\gamma\ell\right) - \tau\left(\frac{\beta\ell}{1+\beta\ell} + \frac{(1+n)k_{t+1}^{1-\alpha}}{\alpha A(1+\beta\ell)}\right). \quad (9)$$

[3] See Casarico (2001), Adema and Verbon (2009) and Adema et al. (2010).

[4] See also OECD (2011).

[5] In a full-fledged model the implicit tax inducing early retirement should have been explicitly specified as in Fenge and Pestieau (2005). This would have made the presentation unnecessarily complicated.

[6] We thus assume defined contributions.