Aging and pensions in general equilibrium: Labor market imperfections matter

David de la Croix [a,b], Olivier Pierrard [c,b], Henri R. Sneessens [d,b,e],*

[a] *CORE, Université catholique de Louvain, Belgium*
[b] *IRES, Université catholique de Louvain, Belgium*
[c] *Banque centrale du Luxembourg, Luxembourg*
[d] *CREA, University of Luxembourg, 162a, avenue de la Faïencerie, L-1511, Luxembourg*
[e] *IZA, Bonn, Germany*

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ABSTRACT

We re-examine the effects of population aging and pension reforms in an OLG model with labor market frictions. The most important feature brought about by labor market frictions is the connection between the interest rate and the unemployment rate. Exogenous shocks (such as aging) leading to lower interest rates also imply lower equilibrium unemployment rates, because lower capital costs stimulate labor demand and induce firms to advertise more vacancies. These effects may be reinforced by increases in the participation rate of older workers, induced by the higher wage rates and the larger probability of finding a job. These results imply that neglecting labor market frictions and employment rate dynamics may seriously bias the evaluation of pension reforms when they have an impact on the equilibrium interest rate.

1. Introduction

Declining fertility, increasing longevity, and the aging of the baby-boom generation will all contribute to substantial increases of the old-age dependency ratio, especially in Western countries. Most of the increase in the old-age dependency ratio is expected to take place between now and 2050. This has raised concern about the sustainability of existing pay-as-you-go (PAYG) public pension schemes (see for instance Gruber and Wise, 2004, 2005) and has motivated pension reform plans.

It is now well understood that a correct appraisal of population aging and pension reform effects calls for a general equilibrium approach. OLG models such as those developed by Auerbach and Kotlikoff (1987) (deterministic setting) and

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* Corresponding author at: CREA, University of Luxembourg, 162a, avenue de la Faïencerie, L-1511 Luxembourg, Luxembourg.
Tel.: +352 46 66 44 6927.
  E-mail address: henri.sneessens@uni.lu (H.R. Sneessens).

Ríos-Rull (1996) (stochastic setup) provide a useful analytical framework to obtain quantitative evaluations (see for instance Börsch-Supan et al., 2002, 2006, and the series of papers presented at the Carnegie-Rochester Conference, 2007). All these studies point out that population aging will make labor relatively scarcer and change equilibrium factor prices. Wages are expected to rise and interest rates to fall. Because aging is a worldwide but unsynchronized phenomenon, savings rates are expected to evolve differently in different countries, leading to significant international capital flows. Börsch-Supan et al. (2006) and Attanasio et al. (2007) both emphasized that a proper evaluation of the impact of aging on equilibrium prices and quantities calls for a multi-country approach. However, Attanasio et al. (2007) suggested that accounting for international capital flows might have little impact on the fiscal variables themselves, because of the counteracting effects of interest and wage rate changes (for instance, lower capital tax revenues compensated for by higher labor tax revenues following an increase in payroll or consumption taxes).

Most existing models rely though on quite streamlined representations of the labor market and assume perfect competition. The focus is on individual hours of work rather than employment. In this context, considering endogenous rather than exogenous labor supply decisions barely changes the estimated quantitative impact of population aging (see for instance Attanasio et al., 2007; Krueger and Ludwig, 2007). As noted by Lucas (2007), neglecting labor adjustments along the extensive margin may be quite misleading. Such adjustments can play a significant role, especially in countries (like many European ones) where labor market imperfections and institutions can have a strong, age-specific impact on job creation and destruction.

The aim of this paper is to allow for such effects and evaluate their quantitative contribution to the macroeconomic effects of population aging. To that end, we combine two strands of research, life-cycle and search/matching models. Labor market imperfections are modeled as in Pissarides (2000), with matching and wage bargaining. To concentrate on the extensive margin effects, we shut off the intensive margin channels by assuming that each worker supplies inelastically one unit of labor. Changes in total hours of work are solely due to changes in the number of employed workers.[1] We furthermore allow for early-retirement effects.

It is well documented that participation rates vary over the life-cycle. Participation rates of middle-aged workers (25–55) are high and similar in both the US and the EU. The participation rates of older (> 55) workers are however lower in the EU. The literature stresses that differences in older participation rates reflect cross-country differences in labor market frictions and in the generosity of early-retirement provisions. Several empirical studies have shown that financial incentives do have a significant impact on early-retirement decisions (see for instance Gruber and Wise, 1999 or Duval, 2004 and the references therein). Although the official retirement age is exogenous in most countries, the actual average retirement age is endogenous and contributes to explaining the lower employment rate of older workers. Like Heijdra and Romp (2009), we thus distinguish the normal (compulsory) retirement age (65 years) and the early eligibility age (55). Workers may choose to retire between 55 and 65, and receive then an early-retirement compensation. Like Börsch-Supan et al. (2006), we consider a stylized two-tier pension system, so that after 65 the revenue of pensioners is made up of two components, a public PAYG pension and a private pre-funded pension (the revenue from accumulated savings).

A few studies have already examined some of the consequences of introducing life-cycle features into frictional labor markets; none of them has however evaluated the effects of future demographic trends. Hairault et al. (2010) examined early-retirement decisions and job search intensities in a search model à la McCall (1970), with exogenous wage distribution extended to include stochastic aging. The emphasis is on the relationship between the time to the retirement age and the financial incentives to invest in search activities. Chéron et al. (2008, 2011) developed this modeling strategy further. They introduced a matching process similar to that used by Mortensen and Pissarides (1994) adapted to include finite lifetimes. They showed that in some circumstances (in particular at fixed, age-independent worker productivity) the job destruction rate is higher for older workers, because the time horizon relevant for the employment decision decreases with age. In these models, there is no post-retirement consumption and no savings; the interest rate is exogenous.

Our model has three main building blocks (i) demographics; (ii) labor market frictions and institutions (including early-retirement provisions); (iii) life-cycle consumption and savings. Ríos-Rull (2001) emphasized the importance of a careful description of the demographic process, which can vary a lot from country to country. To fit actual data, we use French mortality, fertility and migration rates, so that the size of each cohort in every period coincides with the most recent demographic projections. We assume no aggregate uncertainty. In line with most of the literature, we also assume perfect risk sharing across individuals of a given generation, so that individuals are perfectly insured against life and income uncertainty.[2] There are no intended bequests. All workers are perfect substitutes, although the worker's productivity is age-dependent. There is no age discrimination, so that firms posting a vacancy may end up hiring a worker of any age category. We examine in this setup the effects of population aging and pension reforms on equilibrium unemployment and activity rates, and on the cost of public PAYG pensions as a percentage of GDP. In order to focus on labor market imperfections and their consequences, we do not at this stage build a multi-country model. We consider a single country,

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[1] Börsch-Supan and Ludwig (2010) distinguish labor supply adjustments along both the extensive and the intensive margins and discuss the connections/interactions between pension reforms and labor market reforms. Changes along the extensive margin however remain exogenous to the model.

[2] There are a few exceptions. Krueger and Ludwig (2007) and Hairault and Langot (2008), for instance, investigated the consequences of policy reforms (increased taxes or lower benefits) on inequality when financial markets are incomplete and individuals face idiosyncratic productivity shocks.