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Global demographic trends and social security reform ☆

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Abstract

How sustainable are the current social security systems in the developed economies, given the projected demographic trends? The most recent literature has answered this question through dynamic general-equilibrium models in a *closed*-economy framework. This paper provides a new quantitative benchmark of analysis for this question represented by a *two-region model* (South and North) of the world economy where capital flows across regions. The timing and the extent of the demographic transition—and the associated economic forces shaping capital accumulation and equilibrium factor prices—are very different in the two regions. Thus, the projected paths of interest rate and wage rate in the North diverge substantially between closed and open economy. We perform a wide range of policy experiments under both scenarios. Our main conclusion is that if one is interested in quantifying the path of the fiscal variables (e.g., the value of the payroll tax) needed to keep the social security system viable or to finance a transition towards a fully funded system, then these two benchmarks yield similar results. However, if the focus is on quantifying the path of factor prices, aggregate variables and, ultimately, welfare, then the two approaches can diverge significantly.

JEL classification: F21; F41; J11; H55

Keywords: Capital flows; Demographic trends; Social security; Two-region model

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1. Introduction

The developed world will experience dramatic demographic changes throughout the 21st century. The most important projected "demographic events" are three: (i) a significant increase in longevity which will increase life expectancy at 65 by 1.5 years per decade; (ii) a decline in fertility which will induce negative rates of population growth for the next 50 years; (iii) the retirement of the baby-boom generations, born in the 1950s, which will accelerate the rise of the old-dependency ratio (population 60+ as a fraction of the total) after 2010.

These demographic changes raise a number of crucial public policy issues. The one at the forefront of the current debate in the economic and political arena is the "sustainability" of the Pay-As-You-Go (PAYG) pension systems which, since their inception in the 1930s, represent one of the main pillars of social insurance policies in many countries across the developed world.[1]

When the PAYG system was introduced people lived beyond retirement age, on average, for many fewer years than now. As a consequence of the changes in longevity (and parallel trends in fertility), the ratio of retirees to active workers has constantly increased. The remaining two trends highlighted above will further accelerate the ageing of the population structure in the north of the planet and will put the PAYG system under severe strain. For example, in the United States (where the trends are not as daunting as in Japan or Europe), the social security administration, which is currently running a large surplus cumulated thanks to the contributions of the baby boomers, is projected to experience a deficit by 2016 and to exhaust the trust fund entirely, barring reforms, by 2042.

The absence of a structural adjustment in the medium run is an unlikely scenario. The relevant question is, rather, how big should the changes in the current tax/benefits parameters be to ensure that the PAYG system will be in equilibrium in the long run? A vast literature has attacked this question using general equilibrium overlapping-generations (OLG) models, in the tradition of Auerbach and Kotlikoff (1987). For example, one can quantify the necessary long-run increase in the payroll tax, in absence of any change in the current level of benefits. De Nardi et al. (1999) and Kotlikoff et al. (2002) predict an increase of around 15% in the next 100 years to keep the U.S. system solvent.

Clearly, the quantitative results of these experiments are very sensitive to the dynamic path of the rate of return on capital and the wage rate which are predicted for the next century. At least since Diamond (1965), economists have recognized that these factor prices are affected, in general equilibrium, both by the demographic trends and by the particular (pension) policy option in place during the demographic transition. Moreover, if the demographic trends around the world are not fully synchronized, the evolution of factor prices depends crucially on whether one assumes a closed or an open economy. The set of issues arising when considering an open economy are very rarely addressed. For instance, the calculations mentioned above are typically performed under the assumption of *closed* economy.

[1]The economic consequences of such demographic changes are not limited to pension systems. The changes in the age structure are expected to also deeply affect the health insurance system, as the demand for health services rises steeply with age (see Bohn, 2003) and asset prices, since retired baby boomers will strengthen the relative demand of particular financial products that preserve the asset value and its liquidity (see Brooks, 2000; Poterba, 2001; Abel, 2003).