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Can social security be welfare improving when there is demographic uncertainty?

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Abstract

This paper studies the welfare implications of a PAYG pension system in an overlapping generations (OLG) model with demographic uncertainty and incomplete markets. In the absence of public pensions, small cohorts tend to be favoured by the changes in relative prices implied by demographic shocks. PAYG defined-benefit systems can help to share the financial risks created by this type of demographic uncertainty across generations. Our careful quantitative analysis test this possibility with unfavourable results: the overall welfare impact of the public pensions is negative, due to the prominence of the crowding-out effect over the insurance effect.
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1. Introduction

In the last two decades, developed countries have witnessed growing concerns regarding the financial sustainability of their Pay As You Go (PAYG) pension

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systems. It is widely agreed that the ability to extend current pension benefits to future generations of retirees is severely compromised.[1] This gloomy prospect has triggered a very lively public debate, and moved the study of the properties of alternative intergenerational arrangements to the top of the academic research agenda. This paper is a contribution to that fast-growing literature.

Two different demographic processes are commonly held responsible for the problems ahead: a universal trend towards higher longevity and the short-term problems posed by the retirement of the baby-boomers (the large cohorts born during the fifties and the sixties). In this paper we concentrate on the latter process: the consequences of large swings in the size of cohorts. We take a long view on changes in the age-composition of the population, and envisage the large cohorts of baby-boomers as one particular instance of a cyclical pattern governing the size of the workforce. We provide empirical evidence supporting the existence of such a 'demographic cycle' in the case of the US economy and explore whether it may lead to a justification for PAYG pensions entirely based on efficiency grounds.

Even after several decades of strong research efforts, the existence of such a justification is still an open question. Classical overlapping generations (OLG) models formulated in deterministic, dynamically efficient settings leave no room for a welfare improving PAYG pension system (Diamond, 1965; Auerbach and Kotlikoff, 1987).[2] This is mainly due to the crowding-out of private savings. In stochastic economies, in contrast, social security can enhance welfare by substituting some missing or imperfect private insurance markets (Diamond, 1977). Once equipped with truly quantitative general equilibrium models, economist have explored this possibility intensively. Early efforts focused on idiosyncratic risks and found that the overall impact of social security was negative.[3] Attention then shifted to the intergenerational risk sharing of aggregate risks in the context of incomplete financial markets. Krueger and Kubler (2004b) find that in economies with stochastic production where returns to labour and capital are imperfectly correlated the positive diversification effect of PAYG pensions does not overcome the welfare costs of the crowding-out effect.

The consideration of the uncertainties involved in the demographic process itself has progressed more slowly, hindered by the computational difficulties involved. Initial research efforts have taken place in the only tractable setting: the two-period OLG model pioneered in Bohn (2001). He explores the optimal dynamic response to a demographic shock by analytically solving a log-linear approximation of the economy's equilibrium conditions. He finds that defined-benefit (DB) social security systems are ex ante more efficient than defined-contribution or privatized systems. This is a consequence of the favourable movements in wages and interest rates

[1]See Casey et al. (2003) for an updated evaluation of the fiscal pressures lying ahead for OECD countries. A comprehensive analysis for the US economy can be found in Kotlikoff and Burns (2004).

[2]The possibility of dynamic inefficiencies has been consistently rejected in empirical studies (see, e.g., Abel et al., 1989). It is easier to find a positive role for social security in dynastic economies or in economies populated with altruistic agents (see, e.g., Fuster, 1999; Fuster et al., 2003).

[3]See, for example, Hubbard and Judd (1987), Imrohoroglu et al. (1995), Storesletten et al. (1999), Huang et al. (1997) and Miles and Sefton (2002).

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