

# Life-cycle earnings, cohort size effects and social security: a quantitative exploration

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## Abstract

One of the features of the large overlapping generations model pioneered by Auerbach and Kotlikoff (1987) Dynamic Fiscal Policy is that individuals with different experience levels are perfect substitutes in production. This paper replaces this assumption with a labor market characterized by imperfect substitutability between less and more experienced workers. By comparing the quantitative properties of both cases in a calibrated model for Spain, it is found that in the model economy with imperfect substitution, the effects of aging on the financial viability of the pension system are less severe than in the standard model economy with perfect substitution.

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## 1. Introduction

The purpose of this paper is to examine the relationship between the aging of the population and the future prospects of the social security system in Spain. Although this topic has received much attention over the last 10 years mainly due to the sharp expected increase in the share of retired individuals over the working population (see Fig. 1), the existing studies have abstracted from the interaction between the age composition of the population and the life-cycle profile of earnings. Since the pattern of pension benefits and contributions are strongly age dependent, this assumption can have important effects

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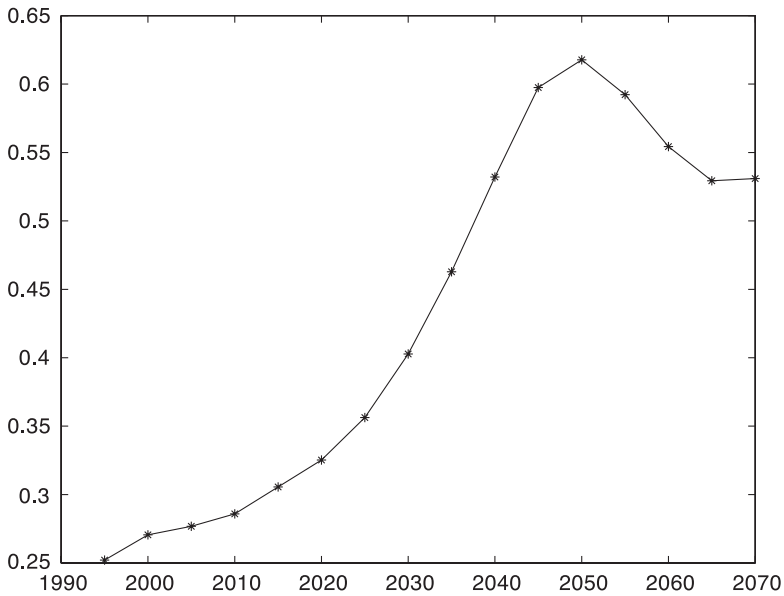


Fig. 1. Expected old dependency ratio in Spain.

on the evolution of the percentage of GDP spent on pensions. For this reason in this paper I study the following question: How do the properties of the standard large overlapping generations model compare to the properties of a model that accounts for the existence of cohort size effects? I study this issue by calibrating a computable overlapping generations model to match some key features of the Spanish economy in 1995. Then I use the demographic projections for this economy that match those from *Eurostat Demographic Statistics 1996* and analyze what should be the adjustment in the tax rate needed to keep balanced the pension system in several model economies that have different assumptions about the degree of substitution of workers with different levels of work experience.

This paper is not new in addressing the effects of the aging process upon the social security systems. The potential economic effects caused by the individuals that belong to the baby-boom generation as they enter retirement has motivated an increasing concern about the sustainability of the pension systems in developed countries. In this sense, the recent research effort on social security has mainly concentrated on the efficiency of the current pay-as-you-go pension system (e.g. Imrohoroglu et al. (1995) and Boldrin et al. (1999)), the design of a feasible reform to a funded system (e.g. Huang et al. (1997)) and the fiscal adjustments that prevents from privatization (De Nardi et al. (1999) and Montero (2000) for the Spanish economy). These studies are characterized by the perfect substitutability of workers with different levels of work experience, namely they abstract from the possible effect that an increase in the number of older workers relative to the number of young less experienced workers could have on the relative labor earnings of these workers.

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