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Endogenous retirement and public pension system reform in Spain

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ABSTRACT

Population aging has spurred developed countries around the world to reform their PAYG pension systems. In particular, delaying legal retirement ages and reducing the generosity of pension benefits have been widely implemented changes. This paper assesses the potential success of these policies in the case of the Spanish economy, and compares them with the results obtained by the (rather modest) reforms already implemented in 1997 and 2001. This evaluation is accomplished in a heterogeneous-agent dynamic general equilibrium model where individuals can adjust their retirement ages in response to changes to the pension rules. We check the ability of the model to reproduce the basic stylized facts of retirement behavior (particularly the pattern of early retirement induced by minimum pensions). The model is then used to explore the impact of pension reforms. We find that already implemented changes actually increase the implicit liabilities of the system. In contrast, delaying the legal retirement age and extending the averaging period in the pension formula to cover most of the individual's life-cycle can reduce the implicit liabilities substantially. These findings reveal the failure of the Spanish political system to distribute the costs of population aging more evenly across the generations.

1. Introduction

Population aging and the fast approaching retirement of the large cohorts of baby-boomers have raised considerable doubts regarding the financial viability of current Pay As You Go (PAYG) pension systems. It is widely agreed that providing future retirees with benefits of similar size to that enjoyed by current generations can only come at the expense of large increases in future payroll taxes. This would imply a significant burden on future taxpayers and thus put the intergenerational contract in jeopardy. Therefore, most industrialized countries have made various attempts to reform their pension systems, by targeting lower benefits and greater labor participation by their more senior workers.[1]

This paper explores the ability of these reforms to enhance the financial prospects of PAYG pension systems over the coming decades. This is undertaken via simulation in a heterogeneous-agent, large-scale, neoclassical growth model with overlapping generations (OLG) and endogenous retirement ages. This model is calibrated to reproduce the demographic process, details of the pension system and the macroeconomic aggregates of the Spanish economy. After checking its ability to reproduce observed retirement patterns, the model is used to simulate the impact of several modifications to current pension rules.

The Dynamic General Equilibrium (DGE) methodology has proved to be particularly well suited to address pension issues in the context of non-stationary demographics. Key factors for the success of these models are their formal consistency, their capacity to deliver quantitative predictions of the effects of institutional changes (accounting for the behavioral reactions of individuals) and their ability to provide consistent welfare evaluations of the reforms. Consequently, the literature has witnessed a large expansion since the original Auerbach and Kotlikoff (1987) model. Focusing on the specific topic of pension reform with population aging, the literature has progressed towards models with more heterogeneity and a better representation of the behavioral responses of the agents. Auerbach et al. (1989) and De Nardi et al. (1999) stand out as the pioneer works in this area. Both papers focus on the effects of reductions in pension benefits and increases in the mandatory retirement age. They find a substantial positive role for the reforms, in terms of the size of both the expected fiscal alleviation and the welfare gains for future generations (largely obtained, however, at the expense of harming older cohorts of current workers). There are, however, two aspects of those papers that are not very satisfactory. In the first place, reductions in pension generosity can decrease the opportunity cost of working at advanced ages, and therefore foster later retirement (and so changing the aggregate financial impact of the reform). Furthermore, real world governments cannot directly determine the retirement age of the workforce. In general, they can only affect individual behavior indirectly, by changing the incentives implicit in the pension rules. By limiting changes to mandatory retirement ages, the question of whether governments can actually delay effective retirement ages by changing the pension rules is left unanswered. Both issues

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[1] The latest projections of the fiscal imbalances expected in 2008/2060 for EU countries can be found in EC-EPC (in press). Whiteford and Whitehouse (2006) provide a concise review of recent pension reforms in OECD countries, while a much more detailed analysis can be found in Caseay et al. (2003).

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can be dealt with by endogenizing the discrete retirement decision of the individuals. This was first attempted in the Kenc and Perraudin (1997a) *partial* equilibrium analysis of the distortions induced by the different parts of the pension regulations.[2] In a more advance, general equilibrium context, Hirte (2001) explores changes to the German pension system allowing for a variable retirement age, but abstracting from intra-generational heterogeneity. This is a relevant omission, as there is a large range of retirement ages across the members of each generation and early retirees are typically more expensive than the "normal" ones. Furthermore, continuous progress has been made in the DGE literature (in this and other fields) in the formulation and solution of models with greater heterogeneity. The analysis of the effects of demographic aging in an international setting in Fehr et al. (2005) is a good example. For the Spanish case, Rojas (2005) explores the effects of aging on the finances of the pension system in a world where individuals with different levels of working experience are imperfect substitutes in production. In both cases, retirement ages are exogenous. To the best of our knowledge, there are only two works that explore pension reforms in models with endogenous retirement and intra-cohort heterogeneity. In Fehr et al. (2003) the early retirement incentives implicit in the Norwegian pension system are explored. Their analysis has a link with the Spanish case in that both pension systems include important non-actuarial benefits that encourage early retirement. The technical details of both papers are, however very different.[3] The work of Díaz-Giménez and Díaz-Saavedra (2009) is closer to the present paper, as it also focuses on the Spanish situation. However, both papers differ widely in a number of technical aspects and in the scope of the reforms explored.[4]

In this paper, we allow individuals to decide when to stop working and collect the pension benefits, and study the effectiveness of policies aimed at delaying retirement. We also account for the indirect behavioral effects of generosity reductions. We explore the effects of the reforms implemented in 1997 and 2001 and consider two possible extensions: (i) larger generosity reductions, engineered through changes to the length of the averaging period in the pension formula; and (ii) delaying the normal retirement age of the system. These institutional changes are explored in a neoclassical economy featuring a detailed representation of public pension rules, intra-cohort differences in labor earnings and hours worked, realistic inflows of overseas workers and imperfect credit and annuities markets. Borrowing constraints at the end of the life-cycle are implemented by extending the rigorous characterization of savings under life uncertainty in Leung (2000) to the analysis of optimal retirement in Crawford and Lilien (1981) and Fabel (1994).

Our main findings can be summarized as follows: First, it is crucial to model minimum pensions and labor income heterogeneity to successfully reproduce the basic stylized facts of retirement in Spain. Second, the reforms implemented so far have failed to improve the financial prospects of the Spanish pension system. Changes introduced in 2001 have actually made things worse by increasing the tendency towards early retirement. In its current form, the pension system would run into deficit from 2018 onwards, and the imbalance will peak around 2045, at a figure greater than 14% of the GDP. In contrast, the proposed additional reforms (which are the subject of a heated public debate in Spain) are quite "effective" in that they both reduce the generosity of pensions and make large groups of workers willing to stay in the labor force until more advanced ages. As a result, the implicit unfunded liabilities of the system are appreciably reduced (by 25 percentage points when the pension formula extends to 40 years and by 10 percentage points when the *normal retirement* is set at 67 years). Not surprisingly, these measures transfer a relevant part of the burden created by the demographic aging to the current cohort of workers. They are effective ways of redistributing the costs of aging across the generations in a more balanced way. Note, however, that the large size of the implicit liabilities still remaining after the reforms means that future cohorts will still bear the brunt of the incoming losses. Finally, we contribute some original results about the key role played by the minimum pensions on the intra-generational welfare effects of the reforms. Current and future cohorts of low income workers can be protected with a policy of indexing the minimum pension to average labor productivity.

As a final reflection, although the quantitative results obtained are specific to the Spanish case, we think that the general qualitative lessons also apply for other countries with similar pension systems (such as Germany or France). Our results, therefore, throw light onto the difficult intergenerational issues (revealed by the financial difficulties of their PAYG pension systems) lying ahead in those countries and the effectiveness of the different polices available to fix them.

The paper is organized as follows. In Section 2, we review the basic empirical patterns of labor supply at advanced ages in Spain and discuss their interactions with the public pension rules. The model is described in Section 3, calibrated to the Spanish economy in Section 4 and simulated in a number of institutional settings in Section 5. The paper finishes with some concluding comments and suggestions for future research in Section 6. There are two appendices: one describing the equilibrium in a formal way (A-1); and the second one providing extra information about the alternative equilibrium paths (A-2).

2. Pension rules and the labor supply of older workers

This section reviews the basic labor supply patterns of older workers in Spain and discusses their economic interpretation. We focus on the interaction between pension rules and retirement behavior. This analysis provides the rationale for our modeling choices in Section 3. We start with a brief overview of Old Age pension rules in Spain.

2.1. Old Age pension regulations in Spain

The system is financed with contributions paid by current active workers, i.e. it is run on a PAYG basis.[5] Contributions are a fixed proportion of gross labor income between an upper and a lower limit (*contribution bases*), which are fixed annually and vary according to

[2] There is a general equilibrium version of this paper (Kenc and Perraudin (1997b)), where the effect of an alignment in pension rules across some major European countries is explored, but this assumes exogenously fixed retirement ages. Kenc and Perraudin also assume a stable population structure and avoid looking into the impact of demographic changes.

[3] The main difference is that the analysis in Fehr et al. (2003) is a steady state exploration, i.e., it abstracts from population aging. Furthermore, the base for their model is the original Auerbach and Kotlikoff (1987) framework, while here we also include a number of improvements to that framework generated in other strands of the literature (e.g. survival uncertainty or borrowing constraints).

[4] Only one reform is studied in Díaz-Giménez and Díaz-Saavedra (2009): delaying in the statutory retirement age till 68. In our paper, in contrast, we explore several of the reforms already implemented in the real world and consider, apart from changes to the "legal" ages, reductions in the generosity of the system. On the technical side there are two major differences. On the one hand, Díaz-Giménez and Díaz-Saavedra (2009) focus on reproducing the wealth distribution of the population. To that end, individual labor productivity is assumed to be stochastic (it follows a three-state Markov chain). This mechanism works well in the aggregate, but generates a rather counterintuitive micro-foundation of retirement (controlled by big discrete jumps in individual labor earnings). On the other hand, both papers take opposite sides regarding the inter-generational distribution of the gains and losses from population aging. In our paper, the pension system is balanced each period, meaning that current cohorts fully appropriate the (temporary) good health of the system at the starting of the simulation. In Díaz-Giménez and Díaz-Saavedra (2009), a Trust Fund (invested in foreign assets) automatically transfers those gains to future cohorts. In our view, both cases are theoretically appealing, but we find our assumption closer to reality (there is a Trust Fund in Spain, but there is no funding policy. The amounts transferred are arbitrarily decided by each government, and, so far, the amounts paid in it have been much smaller than the surplus generated by the system).

[5] We focus on the General Regime (RGSS), the cornerstone of the Spanish Social Security system. In 2001 almost 74% of all affiliated workers were contributing to this scheme, though a number of Special Schemes were still in place. Reforms dating back to 1997 have targeted a rationalization of the system, including the progressive elimination of the Special Regimes, with the exception of the one for self-employed workers. As of 2008, the progress in this direction had been small.