



The effect of social security, health, demography and technology on retirement [☆]



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ARTICLE INFO

Article history:

Received 10 June 2009

Revised 17 January 2013

Available online 9 February 2013

JEL classification:

J2

E2

D5

Keywords:

Retirement

Social security

Health shocks

Medicare

Aging population

ABSTRACT

This article studies the determinants of the labor force participation of the elderly and investigates the factors that may account for the increase in retirement in the second half of the last century. We develop a lifecycle general equilibrium model with endogenous retirement that embeds Social Security legislation and Medicare. Individuals are ex ante heterogeneous with respect to their preferences for leisure and face uncertainty about labor productivity, health status and out-of-pocket medical expenses. The model is calibrated to the U.S. economy in 2000 and is able to reproduce very closely the retirement behavior of the American population. It reproduces the peaks in the distribution of Social Security applications at ages 62 and 65 and the observed facts that low earners and unhealthy individuals retire earlier. It also matches very closely the increase in retirement from 1950 to 2000. Changes in Social Security policy – which became much more generous – and the introduction of Medicare account for most of the expansion of retirement. In contrast, the isolated impact of the increase in longevity was a delaying of retirement.

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1. Introduction

The reduction of the participation of elderly people in the labor force was one of most remarkable economic changes of the last century, particularly in the second half. In 1950, 46% of men aged 65 and over in the United States were working, but only 16.5% were in 2000. Just four out of every ten 66-year-old males were retired in 1950, but fifty years later almost seven out of ten were out of the labor force. This phenomenon is hardly exclusive to the United States. [Blondal and Scarpetta \(1999\)](#) and [Gruber and Wise \(1999\)](#) provide evidence that the workforce participation of the elderly population has declined in many countries of the OECD.

Currently, more than 50% of workers choose to retire at the age of 62, when they first become eligible for early retirement benefits under social security, although at a reduced level. In 1950, in contrast, there was no legal early retirement age and the minimum and normal retirement age coincided at 65. The decision to retire, and to do it early, is influenced by a

[☆] We wish to thank the editor Gianluca Violante, two anonymous referees, Flávio Cunha, Rodrigo Soares, Carlos Eugênio da Costa, Samuel Pessôa, Ricardo Cavalcanti, Luiz Braido and Cesar Santos as well as seminar participants at EPGE-FGV, at the 2011 SED meetings in Ghent, at the 2011 EEA annual Congress in Oslo and at the 2008 SBE meetings in Bahia for helpful comments. We are responsible for any remaining errors. The authors acknowledge the financial support of CAPES and CNPQ.

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number of factors in addition to age and the rules of social security such as health status, income, preference for leisure, etc.¹

This article develops and calibrates a lifecycle general equilibrium model with heterogeneous agents to study the determinants of the labor force participation of elderly American males and to investigate the factors that may account for the changes in retirement between 1950 and 2000. We focus on the role of Social Security, health status and the introduction of Medicare, demographic factors (associated with higher longevity) and changes in the age–efficiency profile.

Our artificial economy is populated by agents who live for a realistic number of periods, have preferences over consumption and leisure and choose at each period whether to stay in the labor force or retire. Agents split their working hours between home production and working in the market. Individuals are ex ante heterogeneous with respect to their preferences for leisure and face uncertainty about their labor productivity, their health status and their out-of-pocket medical expenses. Agents can accumulate a single risk-free asset, which takes the form of capital. Savings may be precautionary and allow partial insurance against the idiosyncratic shocks.

In addition, we model the U.S. Social Security system in detail and also allow agents to decide when to start collecting retirement benefits regardless of their employment status. This is consistent with the empirical evidence in [Rust and Phelan \(1997\)](#) and [Benítez-Silva and Heiland \(2008\)](#), who show that a large number of agents claim benefits while continuing to work, mainly among the nearly elderly ones.

We also take into account Medicare, which was introduced in 1965 and constitutes a federal health insurance program that provides subsidized health insurance coverage to virtually every American over age 65. Medicare provides generous insurance against medical expenditures shocks and could induce earlier retirement because of the limited need to accumulate precautionary savings. Conversely, because of eligibility requirements, it also encourages the delay of retirement until 65.

The model is calibrated to the U.S. economy in 2000, our benchmark year, and is able to reproduce very closely the retirement behavior of the American population. In particular, the model reproduces the peaks in the distribution of Social Security applications at ages 62 and 65 and the observation that unhealthy and poor individuals retire earlier.

The model is then simulated considering the changes in Social Security, Medicare, age–efficiency profile and demography between 1950 and 2000. We find that the simulated labor force participation of older individuals increases to levels similar to those in the data. We show that the incentives implied by the institutional factors concerning Social Security and Medicare legislation are very effective in influencing retirement behavior. For instance, a counterfactual experiment in which all parameters were kept at their 2000 values, but the rules of Social Security were changed to those of 1950, finds that the retirement rate drops for every age group. More importantly, the retirement peak at age 62 disappears, as in 1950 when there was no early retirement benefits.

This article extends and improves the previous literature in many aspects. Our model is related to [Imrohorglu et al. \(1995\)](#), [Huggett and Ventura \(1999\)](#), [Nishiyama and Smetters \(2007\)](#), and [Rojas and Urrutia \(2008\)](#). These models provide a framework rich enough to deal with all the factors that potentially affect the retirement decision. Furthermore, this structure allows us to model more accurately the dynamic structure of a social security system. In these papers, however, the retirement decision is exogenous in contrast to our model.

[Conde-Ruiz and Galasso \(2003\)](#) endogenize retirement, but in a purely theoretical political-economy framework with no quantitative analysis. [French \(2005\)](#) estimates a partial equilibrium lifecycle model of retirement behavior in which health and wages are uncertain. He uses the model to simulate the impact on the labor supply of modifications to Social Security legislation. [Diaz-Gimenez and Diaz-Savavedra \(2009\)](#) use an overlapping generational model with an endogenous retirement decision to study pension system reform in Spain. Our model has many features in common with theirs; but as we study the American economy, the calibration and institutional details of the model are obviously very different as are the experiments we run. Finally, in [Kopecky \(2011\)](#) whereas the decision to leave the labor force is endogenous as in our article, hours worked are fixed in every period and there is no social security in the model, which plays an important role in our case.²

As for the channels we emphasize as affecting retirement behavior, the importance of higher Social Security benefits has been investigated in a number of articles using a variety of estimation methods.³ Nevertheless, this literature has not come to a consensus. In fact, whereas [Gustman and Steinmeier \(1986\)](#) and [Rust and Phelan \(1997\)](#) have found that Social Security benefits have had a strong negative effect on male labor supply, [Burtless \(1986\)](#), [Stock and Wise \(1990\)](#) and [Krueger and Pischke \(1992\)](#) concluded that it had little effect. These results suggest that either there are problems associated with the methods that have been used to investigate this relationship,⁴ or there are other explanations that must be taken into consideration.⁵ In this article, we bring together, in a single model, different explanations for the decision to retire.

¹ For instance, according to data from the Health and Retirement Survey, approximately 90% of individuals between 55 and 85 years of age who declared themselves in poor health were retired in 2000, compared with only 40% of those in excellent health.

² Another related reference is [Eisensee \(2006\)](#) who uses a similar method to study how changes in the Social Security system in the U.S. affected retirement. His model, however, does not allow for idiosyncratic shocks – an important feature of our model – or health status, which we found to be important in the decision to leave the labor force.

³ A recent survey of the literature can be found in [Coile and Gruber \(2007\)](#).

⁴ [Coile and Gruber \(2007\)](#), for example, argue that some of these studies consider social security impacts at a point in time, but not the effects that arise from the time pattern of social security wealth accruals.

⁵ [Krueger and Pischke \(1992\)](#) raise this point, after finding little effect of social security benefits on labor supply.

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