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The effects of longevity and distortions on education and retirement

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Abstract

This article studies the impact of longevity and taxation on life-cycle decisions and long run income. Individuals allocate optimally their total lifetime between education, working and retirement. They also decide at each moment how much to save or consume out of their income, and, after entering the labor market, how to divide their time between labor and leisure. The model incorporates experience–earnings profiles and return to education function that follows evidence from the labor literature. In this setup increases in longevity raises the investment in education—time in school—and retirement. The model is calibrated to the US and is able to reproduce observed schooling trends of the last century. It also reproduces the increase in retirement, as the evidence shows. Simulations show that a country equal to the US but with 20% smaller longevity will be 25% poorer, mostly because of the impact of life expectancy on human capital formation and retirement. In this economy labor taxes have a strong impact on the per capita income, as it decreases labor effort, time at school and retirement age, in addition to the general equilibrium impact over physical capital.

JEL classification: O41; J20; O11; I20

Keywords: Life expectancy; Human capital; Retirement; Long run income

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1. Introduction

One of the most impressive facts of the twentieth century is the large increase of educational attainment of the adult population. In 1990, the median schooling of a male aged 25 years in the US, according to estimations in Gustavus and Nam (1968) based on Census Data, was 6.8 years. By 2000 it had jumped to more than 12 years (Jones, 2002).

Even more dramatic is the rise of longevity in the same period. By the beginning of last century life expectancy at birth was, on average, less than 48 years, according to the National Vital Statistics Reports (2002). One hundred years later it was estimated to be 77 years. Although most gains were related to reduction of child mortality, the increase of adult longevity in the same period is very significant. The life expectancy of a man aged 20 years in 1900 was 42.8 years, but in 2000 a man of the same age is expected to die 57.8 years later, a 15 years variation.

These two facts may not be unrelated. Greater longevity allows for extension of the population working life and, consequently, an increase in the present value of the flow of wages of a given investment in education. Higher returns to education in turn induce individuals to stay longer in school, increasing average human capital of the population, with a potential effect on long-run income.

At the same time, the number of years individuals expend at retirement increased continuously in the previous century. Lee (2001) calculates that the expected period of retirement increased from 2.6 years for the cohort born in 1880 to 13.1 years to the cohort born in 1930. Moreover, labor force participation for man aged 65 and over went from 58% in 1930 to only 16% by 1985 (Kalemli-Oczan and Weil, 2004). In principle this fact does not contradict the link between life expectancy and schooling, as working and retirement lives could have increased with the longevity. However, Gendell and Siegel (1992) estimate that age at final retirement has fallen by 4 to 5 years since 1950, for both man and woman. Median age of retirement for men fell from 66.9 years in 1950–1955 to 62.6 in 1985–1990. More years at school and younger retirement age can only mean shorter career length, something at odds with the idea that longevity influences schooling because it increases the period one can enjoy the return to education investment.

In this paper we develop a model that reconcile the above facts. Individuals allocate their total lifetime between education, working and retirement. They also decide at each moment how to divide their time between labor and leisure and how much to save or consume out of their income. The labor/leisure choice is key for the retirement decision. In order to explain, however, why people stop working completely at a certain age and do not spread evenly leisure, the model incorporates experience–earnings profiles that mimics the evidence from the labor literature (e.g., Heckman et al., 2003, among many). At a given moment of a worker life, productivity growth slows down or decreases, so that labor supply falls continuously up to a point when the marginal gain of working is smaller than that of leisure and then individuals leave the labor market for good.

In this model, increases in longevity raises investment in education and retirement life, everything else constant. We are then able to explain in an unified framework these two life-cycle observations. The model is simulated after it was calibrated to US observations. We reproduced qualitatively and quantitatively the main facts. Moreover, if productivity in late periods of life decreases faster today than in the past—something that one may infer from estimations across different decades—in addition to rising retirement life we obtain that retirement age falls with longevity. This is so because agents prefer to work more intensively when they are young and relatively more productive, increase savings, and retire earlier.