Changing Life Cycles and Challenges for Pension Policies

Evidence from OECD Countries

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Abstract

This paper analyzes the gender specific effect of a rising life expectancy on the retirement span. Utilizing a new indicator for life cycle arrangements, the Ratio of Retirement to Lifespan (RRL) quantifies the proportion of life time spent in retirement and characterizes the development of the retirement span. Furthermore, the change in the retirement span is decomposed and the impact of declining mortality (*"mortality effect"*) and varying retirement ages (*"behavioral effect"*) are evaluated separately. Based on the analysis of a cross-sectional panel data set of OECD countries, this elaboration discovers that the change of the retirement span between 1970 and 2005 in most OECD countries is mainly determined by the behavioral effect rather than by mortality improvements. By calculating the required effective retirement ages for several intergenerational balanced life-cycle development scenarios, the paper highlights the policy challenge in postponing retirement entry.

Background

The record life expectancy in industrialized countries has risen continuously over the past 160 years. Within the last century, the human record life

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expectancy increased from 60 to 85 years for females and from 58 to 78 for males (Oeppen and Vaupel, 2002). This longer life time is a positive achievement for modern societies. A longer life time offers several options how to use the gained years of an individual's life, e.g. to invest a longer time in education, to have a longer active working career, to enjoy more leisure during the working life or to have a longer retirement span. Despite the diverse possibilities for life-cycle arrangements mortality improvements are accompanied by a dominant trend. In almost all OECD countries the average effective age of retirement has declined over the last decades (Gruber and Wise, 1999; OECD, 2006). Both developments are causing an expansion of the retirement span, that could impose substantial economic consequences for populations.

An increase of time spent in retirement raises the need for retirement income, stimulating life-cycle motives for savings (e.g. Ando and Modigliani, 1963; Modigliani and Brumberg, 1954; Modigliani, 1986). This affects in particular savings rates, social transfers and the welfare of the elderly (e.g. Bloom et al., 2003, 2007) as well as asset prices and international capital flows (e.g. Abel, 2003; d'Albis, 2007; Börsch-Supan et al., 2006; Poterba, 2001). These aspects have crucial implications for economic growth, consumption levels and intergenerational transfers (e.g. Auerbach et al., 1999; Deaton and Paxson, 1997; Mason et al., 2006). A longer time spent in retirement also endangers the long-term financial sustainability of pension systems (e.g. Creedy, 1998; Diamond et al., 1996; OECD, 2000, 2007, 2009a). The magnitude of these possible economic consequences depends primarily on the utilization of the gained life years and the alteration of the retirement span (Lee and Goldstein, 2003).

Despite its importance only a few studies have analyzed life-cycle changes and the development of retirement spans (e.g. Costa, 1998; Lee, 2001). Moreover, the analyses do not include a comparison of countries nor does the literature provide a special gender differentiation in the context of retirement patterns.

The paper provides insights in the development of gender specific life-cycle patterns in OECD countries over the last decades. The major purpose of the present study is to disentangle the causes of retirement span changes. Therefore, the impact of increasing mortality (*"mortality effect"*) and the

impact of declining retirement ages (*"behavioral effect"*) are calculated separately. Furthermore, possible scenarios for an intergenerational balanced life-cycle are presented. The resulting challenges for pension policies concerning the required effective retirement ages are discussed.

Methods and Data

For analyzing changes in the retirement span it is useful to quantify the absolute measures of time spent in retirement with respect to the length of the whole life-cycle. This proportional view on the life-cycle offers the opportunity to evaluate comparable measures over time and between countries. Changes in the effective retirement age and in longevity are captured simultaneously.

Let the Ratio of Retirement to Lifespan (RRL) at time t, denoted $\rho(R_t)$, be the relative measure of the proportion of entire life time of an individual spent in retirement conditional on survival. Evaluated at the age of retirement, the average RRL depends on the retirement age (R_t) and on the remaining life expectancy ($e(R_t)$) at that age. The life time horizon ($T(R_t)$) can be measured as the remaining life expectancy at the age of retirement plus the age at retirement. Formally:

$$\begin{aligned} \rho(R_t) &= \frac{e(R_t)}{e(R_t) + R_t} = \frac{e(R_t)}{T(R_t)} \\ \text{with} \quad & R_t \geq 0,\ e(R_t) > 0 \\ \text{and} \quad & \rho(R_t) \in (0, 1)\,. \end{aligned}$$

For the calculation of the Ratio of Retirement to Lifespan OECD country data on the male and female average effective age of retirement is utilized (OECD, 2009b). Country specific life expectancy measures are taken from the Human Mortality Database (HMD, 2009). Cohort life expectancy measures are calculated as proposed by Andreev and Vaupel (2006) with forecasted mortality rates based on the Lee-Carter method using HMD period mortality data.

To disentangle the drivers of life-cycle change the paper adapts the approach proposed by Lee (2001). The effect of reduced mortality on the life-cycle (*"mortality effect"*), for example between 1970 and 2005, is assessed by calculating the RRL of 2005 using the effective average age of retirement of 2005 and the life expectancy measures of 1970. This counterfactual estimate illustrates how the RRL would have been 2005 if there had been no change in mortality during the respective period. The behavioral impact on the life-cycle change (*"behavioral effect"*) is calculated in a similar way. The behavioral effect between 1970 and 2005 is quantified by calculating the RRL of 2005 with the life expectancy measures from 1970 and the retirement age of 2005.[1]

The policy challenge to govern the effective retirement ages is discussed by defining three different scenarios for intergenerational balanced life-cycle developments. Therefore, the required effective retirement ages are derived from a change in the RRL adjusted to the development of (i) mortality, (ii) population growth and (iii) productivity growth.

Preliminary Results

In the period between 1970 and 2005 the proportion of life time spent in retirement based on cohort measures increased from 15% to 23% for males and from 20% to 29% for females on OECD average .

There are noteworthy differences in life-cycle changes among countries and between males and females in the level as well as the development of the Ratio of Retirement to Lifespan (RRL).

Between 1970 and 2005 on average about 43% of the life-cycle change was driven by a mortality decline. For countries like Spain, France or Austria the behavioral effect has a striking impact on the life-cycle change whereas in countries like the US, the UK or Sweden the mortality effect and the behavioral effect have a more balanced influence on life-cycle arrangements.

[1]The underlying assumption of the analysis is that the retirement decision is not primarily determined by mortality expectations.

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