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Mortality transition and differential incentives for early retirement ☆

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Abstract

Many studies specify human mortality patterns parametrically, with a parameter change affecting mortality rates at different ages simultaneously. Motivated by the stylized fact that a mortality decline affects primarily younger people in the early phase of mortality transition but mainly older people in the later phase, we study how a mortality change at an arbitrary age affects optimal retirement age. Using the Volterra derivative for a functional, we show that mortality reductions at older ages delay retirement unambiguously, but that mortality reductions at younger ages may lead to earlier retirement due to a substantial increase in the individual's expected lifetime human wealth.

JEL classification: D91; J11; J26

Keywords: Mortality decline; Incentive for early retirement; Years-to-consume effect; Lifetime human wealth effect

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1. Introduction

In the twentieth century, people tended to retire earlier in most developed countries, despite the fact that there was a steady and significant increase in life expectancy. In the US, for example, the life expectancy at birth for men who were born in 1900 was about 50 years. This figure increased substantially to over 70 years for those who were born in the middle of the century, and increased further to almost 80 years for those born in the 1990s.[1] Despite increasing life expectancy, however, labor force participation rates of men aged 65 and over steadily declined from over 60% in 1900 to around 20% at the last decade of the century, while the rates of men aged 55 to 64 declined from around 90% to below 70% for the same period (Costa [8, Fig. 2.1]).[2]

Various explanations have been proposed for this seeming paradox. For example, the important role of the generous benefits provided by the social security system has been analyzed by Gruber and Wise [10,11], and the wealth effect associated with sustained economic growth has been examined by Costa [8]. To complement these well-known explanations, several researchers (such as Bloom et al. [3], Kalemli-Ozcan and Weil [17]) examine the relatively neglected question of how mortality decline affects retirement age. In particular, Kalemli-Ozcan and Weil [17] show that people may retire earlier if the decrease in the variability of age at death associated with mortality decline is very significant. In this article, we continue this line of inquiry by studying the differential incentives for early retirement provided by mortality changes at different stages of demographic transition.

A salient feature of mortality changes in many countries is that, while life expectancy has increased steadily over the last two centuries, mortality decline does not occur uniformly across age groups (Lee [18], Wilmoth and Horiuchi [23], Cutler et al. [9]).[3] In the earlier stage of mortality transition, a decline in mortality pertains mainly to younger people, particularly infants and children, whereas in the later stage, an "aging of mortality decline" has occurred, characterized by "successively larger reductions in mortality rates at older ages, and by smaller reductions at younger ages" (Wilmoth and Horiuchi [23, pp. 484–485]).[4] An illustration of this pattern is given in Fig. 1, which is based on the survival data, starting from age 20, of different cohorts of men in the US. The upper panel shows the survival curves of men born in four different decades: the 1900s and 1910s at the beginning of the century, and the 1980s and 1990s towards the end of the century. It is observed that the improvement in survival probabilities at various ages is more substantial for the earlier period. Moreover, unlike the later period, the mortality decline at the

[1] The data, which are based on the life tables constructed by the Office of the Actuary of the Social Security Administration, can be downloaded from the Berkeley Mortality Database (http://www.demog.berkeley.edu/~bmd/). Obviously, some figures for these cohort life tables reflect projected mortality.

[2] Similar conclusions are also obtained for slightly different age groups, countries and time periods. For example, clear downward trends are observed in labor force participation rates for men aged 60 to 64 in a larger set of developed countries (except perhaps Japan) in the second half of the twentieth century (Gruber and Wise [11, Fig. 1]).

[3] Another feature of observed mortality decline, one that is emphasized by Kalemli-Ozcan and Weil [17, p. 66], is that "as life expectancy has risen, uncertainty regarding the date of death has fallen". Both features have been mentioned in Wilmoth and Horiuchi [23]. In Section 3 we will compare Kalemli-Ozcan and Weil [17] with this article, and link their differences to these two features of mortality decline.

[4] A related and more formal term is "epidemiologic transition", which refers to the transition "in which degenerative and man-made diseases displace pandemics of infection as the primary causes of morbidity and mortality" (Omran [19, p. 510]). In this article, we do not investigate the causes of mortality decline but rather take them as given, and focus on the implications of the "aging of mortality decline" aspect of this transition.