



Labor supply of elderly people, fertility, and economic development



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ARTICLE INFO

Article history:

Received 26 April 2016

Revised 15 September 2016

Accepted 7 December 2016

Available online 10 December 2016

JEL classifications:

D91

J13

J14

J26

Keywords:

Fertility

Life expectancy

Labor supply of elderly people

Human capital

ABSTRACT

Increases in life expectancy and the fertility rate have been observed as per-capita income increases in economically developed countries with high per-capita income. We explain these observations using a synthetic economic model with endogenous lifetime, retirement, and human capital accumulation. In contrast to the result obtained by assuming an institutionally fixed and compulsory retirement, a longer life expectancy attributable to rises in per-capita income can induce elderly people to leave the labor market later, thereby enabling them to increase consumption of goods as well as “children” when young. Consequently, higher per-capita income can be associated with higher fertility.

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1. Introduction

It is well recognized that life expectancy has been improved in many countries over the past few decades. Recently, [Prettner and Canning \(2014\)](#) and [Bloom et al. \(2014\)](#) showed that an increase in longevity plausibly raises the optimal retirement age, although various institutional barriers and financial incentives for earlier retirement have lowered the actual retirement age. As a matter of fact, the actual labor force participation rates of elderly people have risen for the countries during the past decades.¹ [Fig. 1](#) shows that the labor force participation rates of people aged 60–64 have risen in developed economies of G7 since around 2000.²

[Bergh and Nilsson \(2010\)](#) used 92-country panel data for 1970–2005 to demonstrate that public health measures and nutrition can affect longevity. [Finch \(2010\)](#) also argued that immune function and nutrition have been of major importance

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¹ In contrast, [Strulik and Werner \(2016\)](#) recently demonstrated theoretically that workers optimally respond to a longer stay in a healthy state of high productivity by obtaining more education and supplying less labor.

² Even over a longer period, the labor force participation rate of those aged 65 and over increased from 21.6 in 1975 to 22.1 in 2010 for the United States, from 15.4 in 1976 to 16.2 in 2010 for Canada, and from 8.7 in 1984 to 11.3 in 2010 for the United Kingdom, although the rate fell from 10.6 in 1975 to 5.7 in 2010 for Germany, from 14.0 in 1975 to 2.4 in 2010 for France, from 10.4 in 1975 to 5.7 in 2010 for Italy, and from 44.4 in 1975 to 28.8 in 2010 for Japan. See [The Japan Institute of Labour Policy and Training \(2012\)](#).

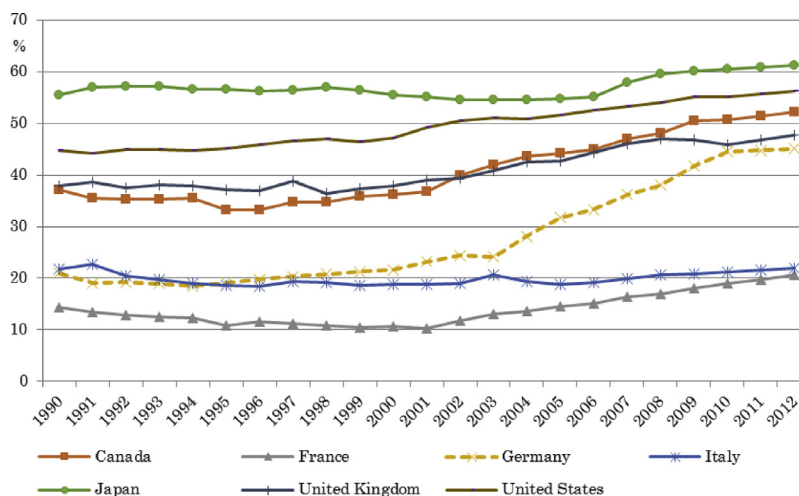


Fig. 1. Labor force participation rates of workers aged 60–64 in G7 countries.

Source: LABORST internet, economically active population, estimates and projections (6th edition, Oct 2011) http://laborsta.ilo.org/applv8/data/EAPPEP/eapep_E.html, cited on 15 March 2013.

in the evolution of aging and longevity during the last 200 years. Bloom and Canning (2000) pointed out that higher income gives greater command over many of the goods and services that promote health, such as better nutrition and access to safe water, sanitation, and good quality health services.³ In Bloom and Canning (2000), health status is measured by life expectancy. In other words, increases in per-capita income engender longer life expectancy, which might in turn postpone the optimal retirement age.

During the years just after World War II, life expectancy gaps between countries were rapidly falling across the world. In explaining that fact, Cutler et al. (2006) emphasized the diffusion of health technologies and the implementation of public health measures (see also Acemoglu and Johnson, 2007; Weil, 2007). Becker et al. (2005) also showed that inequality of life expectancy among countries, especially between developed and developing, decreased during 1960–2000, although health investment was much greater for developed than for developing countries.

However, a stable health function cannot explain the convergence unless returns to spending in health are implausibly high for developing countries. Bloom and Canning (2007) demonstrated that changes in life expectancy across countries during 1963–2003 did not reveal a simple convergence process, leaving twin peaks, despite continual advancement in many countries within clusters. Canning (2011) suggested that although the picture of health being largely “exogenous” seems true today, this was probably not the case for health improvements in the eighteenth and nineteenth centuries. Demographic transition is said to be a health transition that is associated with better nutrition as well, whereas, as Sen (1991) argued, the political framework of democracy can play an important role in ensuring the provision of basic nutrition and public health services.

The Economist (2009) has suggested that a U-shaped relation between fertility and per-capita GDP exists, implying that the fertility rate will rise with income at higher income levels in rich countries (see also Feyrer et al., 2008; Luci-Greulich and Thévenon, 2013, 2014; Hazan and Zoabi, 2015).⁴ Fig. 2 portrays the relation between the total fertility rate and per-capita GDP for G7 countries. Some countries have experienced a rebound of fertility with respect to per-capita income in the 2000s. In these countries, longer life expectancy and rising fertility have been observed recently and simultaneously with high per-capita income since the late 1990s, although the world financial crisis disturbed the economies in the late 2000s. Higher per-capita income engenders longer lifetime through improvements in health conditions, which might bring about higher fertility. However, for example, Strulik and Vollmer (2015) reported that although life expectancy converges across countries, the world is still separable into a low-fertility regime and a high-fertility regime. Therefore, in highly developed countries with higher per-capita income, increases in income can have various effects not only on the economic behaviors of individuals but also on the path of economic development. In this study, we mainly elucidate the effect of increases in life expectancy on fertility behaviors through changing the timing of retirement. The question is: Does longer life expectancy increase fertility by raising the retirement age?

This study investigates the demographic dynamics along the development path, assuming that life expectancy depends on per-capita income when young and that individuals endogenously choose the timing of retirement corresponding to

³ Their focus is to examine the other link from health to income, and they concluded that health is evidently one of the more effective drivers for development.

⁴ Myrskylä et al. (2009) presented an inverted-J relation between fertility and the Human Development Index for developed high income countries, whereas the Human Development Index is composed of per-capita income, life expectancy, and years of schooling.

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