

Fertility, mortality and the developed world's demographic transition

Hans Fehr^{a,*}, Sabine Jokisch^b,
Laurence J. Kotlikoff^{c,d}

^a University of Würzburg, Sanderring 2, 97070 Würzburg, Germany

^b Ulm University, Helmholtzstr. 18, 89081 Ulm, Germany

^c Boston University, 270 Bay State Road, Boston, MA 02215, United States

^d NBER, United States

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Abstract

This study uses Fehr et al. [Fehr, H., Jokisch, S., & Kotlikoff, L. J. (2004a). The role of immigration in dealing with the developed world's demographic transition. *FinanzArchiv*, 60, 296–324; Fehr, H., Jokisch, S., & Kotlikoff, L. J. (2005). The developed world's demographic transition—the roles of capital flows, immigration, and policy. In R. Brooks & A. Razin (Eds.), *Social security reform* (pp. 11–43). Cambridge: Cambridge University Press] dynamic general equilibrium model to analyze the effects of changes in fertility and mortality on the developed world's demographic transition. The model features three regions – the U.S., Japan, and the EU-15 – and incorporates age- and time-specific fertility and mortality rates, detailed fiscal institutions, and international capital mobility, subject to adjustment costs. The model's life-cycle agents maximize expected utility taking into account the uncertainty of their dates of death. Since there is no altruism, bequests arise solely as a result of incomplete annuitization. The model fits the developed world's demographic, fiscal, and economic initial conditions quite closely.

Our simulations show that, all else equal, higher fertility and lower mortality will, respectively, improve and worsen fiscal and economic conditions along the world's dynamic transition path. But we find that such demographic changes, even when very large in size and relatively quick in nature, would come too late to materially alter the fiscal and economic picture over most of this Century. Indeed, our simulations indicate only minor effects on the developed world's rather bleak baseline transition path prior to roughly 2070 arising from either major increases in fertility rates or major reductions in mortality rates. Although such changes

* Corresponding author. Tel.: +49 931 31 2972.

E-mail address: hans.fehr@uni-wuerzburg.de (H. Fehr).

have important long-run fiscal and economic effects, they occur too gradually to materially alter the short- and medium-term outcomes.

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1. Introduction

Fertility rates in much of the developed world and some parts of the developing world, notably China, are remarkably low and have been so for decades. In Italy the rate fertility rate is only 1.2. In Germany and Japan it is just 1.3.¹ Absent sufficient immigration, fertility rates this low spell one and only one thing—depopulation. And immigration has not been high in Japan and Europe to prevent this from happening. Indeed, Japan's population is now shrinking, and Europe's will begin shrinking in just 4 years. Both economies are already seeing a decline in their work forces.

The populations of Japan and Europe are slated to decline by 30 million and 80 million, respectively, by mid Century. In contrast, the U.S., whose population is rising thanks to a 2.1 percent fertility rate and a high rate of immigration, will add 100 million Americans over the same period.

The striking low fertility rates in the EU and Japan and their implications for population implosion are hard to believe. They are even harder to accept as permanent. This explains why the OECD, the United Nations (see [UNPD, 2003](#)), and individual governments foresee, albeit with little justification, major fertility rebounds in the near term.

The relatively high U.S. fertility rate will not only help keep the U.S. population growing, it will also keep the U.S. relatively young—young that is compared to its trading partners. Compared to its past, the U.S. is slated to get quite old. By mid Century, 21 percent of Americans will be 65 or older. In Germany, the figure will be 31 percent; in Japan, it will be 37 percent. The current elderly shares in these countries are 13 percent, 17 percent, and 18 percent, respectively.

The source of this projected aging is, in part, the baby bust that followed the baby boom and, in part, the dramatic rise in life expectancy. Japanese life expectancy at birth is now 30 percent higher than it was in 1950. By 2050 it will be almost 40 percent higher. The U.S. and European gains in life expectancy are smaller, but still very impressive. By mid-century roughly half of all Japanese and Europeans will be older than 50 and half of Americans will be older than 42.

The projected rise in dependency rates portends major increases in payroll and other tax rates. This paper explores the roles of fertility and mortality in altering fiscal and economic performance over the short, medium, and long runs. This paper's goal is understanding whether alternative fertility or mortality rates could significantly alter the pending old-age fiscal crisis.

Whatever is the answer to this question, one thing is sure—many countries are now and have long been actively engaged in trying to influence both fertility decisions and mortality outcomes. China's oft-draconian one-child policy, India's past compulsory sterilization policies, Sweden's provision of full day care services, and France's generous child tax deductions and child tax

¹ For these and other demographic statistics cited see [UNPD \(2003\)](#).

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