From divergence to convergence in sex differentials in adult mortality in developed countries

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Abstract for IUSSP 2005

Summary:

The secular trend in diverging sex differentials in adult mortality in developed nations is re-examined based on the reversal experienced by most western countries in the last two decades.

After reviewing the past levels and trends in life expectancy and the sex differentials among adults and elderly for 40 developed countries, this paper investigates the following issues: (a) which age groups are most responsible for the reduction in sex differentials in mortality, and (b) what factor explains the most the reversal in historical trends.

Several hypotheses are explored to explain this reduction in sex differentials: (1) are women's gains in life expectancy been slowing down or are men making faster progress in survival, (2) are there limits to diverging sex differentials and (3) are we converging toward a universal model of sex differentials.

Background:

The XXth century has been marked by a drastic improvement in life expectancy. While improved survival at early ages has been fundamental in increasing life expectancy at birth, most of the gains in recent decades have been concentrated among adults and especially among elderly.

Both men and women have been experiencing greater survival at all ages. But, while the difference in adult survival was relatively small when mortality was high, progress in adult survival throughout the past century have been different between genders. The fact that women have almost consistently been experiencing faster improvements than men in gains of life expectancy has led to an increasingly divergent path. Model life tables (e.g., Coale and Demeny) and more recent mortality projection models built using cross-sectional time series of mortality rates by sex and ages (e.g., Lee-Carter) often extrapolates these past trends in the future. In most cases, the long term trends obtained by projecting each sex independently lead to implausible large differences between sexes – especially in the light of the recent trends experienced by most countries with the highest life expectancies.

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To the exception of Eastern Europe and the economies in transition as well as Japan, Spain, Portugal and Greece, the rest of the developed nations have been reversing over the last two decades their secular trends in sex differentials. While both sexes are still experiencing some notable reductions in overall mortality, the difference in adult survival between men and women has been decreasing toward the levels experienced in the 1950s (see Figures 1 and 2 in annex).

Data:

To control for population heterogeneity and cross-national differences, the analysis focuses on 40 developed countries with annual life tables for all causes of death spanning from 1950 to 2000.

This research draws on two sources of information: the Human Mortality Database, sponsored by the University of California, Berkeley, and the Max Planck Institute for Demographic Research (http://www.mortality.org) providing data for 20 countries, and the World Health Organization Mortality Database (http://www.who.int/whosis/) provided data for another 20 nations. Countries were chosen on the basis of the availability of reliable data and time-series for the last decades.

Research Method:

After reviewing the past levels and trends in life expectancy and the differentials by sex and age, this paper investigates the following issues: (a) which age groups are most responsible for this reduction in sex differentials in mortality, and (b) what factor explains the most this reversal in historical trends. Several hypotheses are possible to explain this reduction in sex differentials: either women's gains in life expectancy have been slowing down or men have been making faster progress in survival.

National time-series are used to explore these issues and to control for the level of life expectancy experienced by the respective countries. This is important to resolve the issue whether all countries are moving toward a universal reduction in sex differentials once they have reached some advanced level of life expectancy. The diverging pathways noted between Western and Eastern countries and the regional differences and national exceptions are re-examined within this context. In fact, one of the aims of this research is to explore whether there are some limits to the divergence in sex differentials, and whether these divergences are leveling-off at some point or in some populations.

Several measures have been proposed by different authors to analyze sex mortality differentials (Lopez ,1983). In this analysis, I examine the difference between male and female survival at various ages using two of the most commonly used measures:

(a) the sex differentials in life expectancy at age 30 for age group 30-60, and at age 60 for age group 60-85

(b) the absolute and relative contribution of sex differentials in mortality in age groups 30-60 and 60-85 to sex differentials in life expectancy at birth.

The female-male difference in life expectancy at various ages is analyzed by decomposing the change between periods using Pollard's decomposition technique.

The variations over time of the sex differential in life expectancy and the gains in life expectancy at different ages are analyzed using some multivariate regression analysis controlling for fixed and random effects at the country and regional levels.

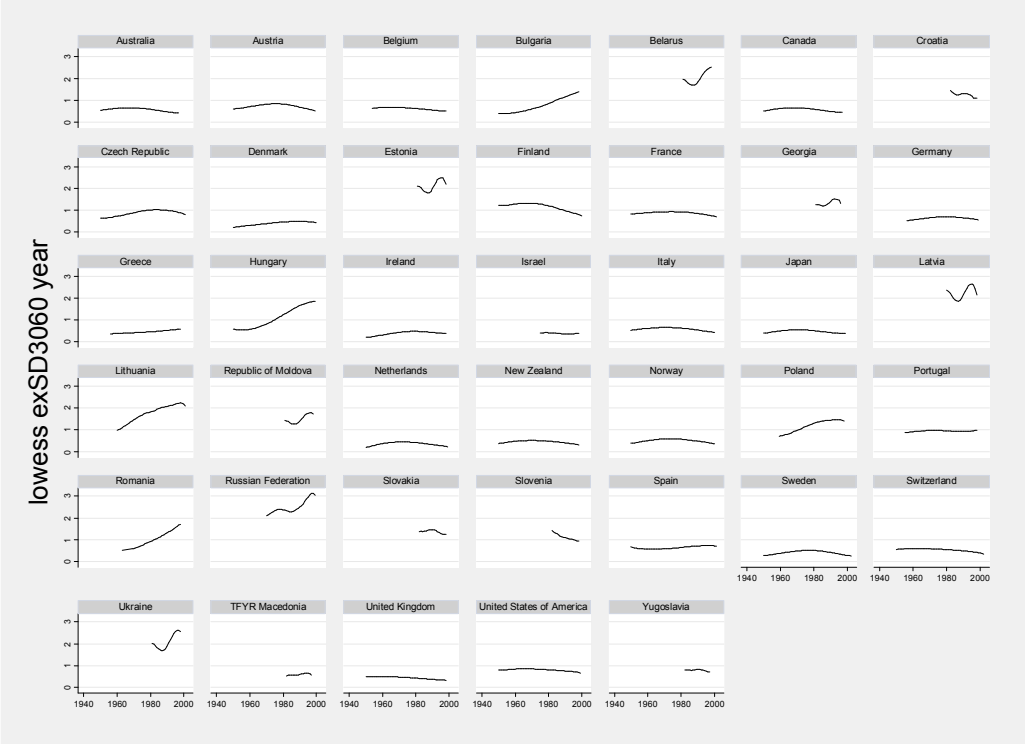
Expected findings:

Many studies have tried to identify the factors responsible for sex mortality differentials, and while no definite answers are available, the debate revolves between the role played by genetic factors (e.g., biological differences between sexes) and environmental differences (e.g., socio-cultural differences in attitudes and behaviors).

Our underlying hypothesis is that many countries are at different stages of their epidemiological transition, and the reduction of the sex differentials is caused by both a deceleration/leveling of female survival and an acceleration of male survival. Thus the reduction of the gender gap in many instances would reflect a reduction in exogenous causes of male mortality (e.g., life style, health behaviors, etc.), and the convergence toward a common path for both sexes would suggest that the remaining sex differential is increasingly explained by the irreducible biological sex differences.

Annex

Graph 1: sex differentials in life expectancy at age 30 for age group 30-60



Graph 2: sex differentials in life expectancy at age 60 for age group 60-85