Global inequality in life expectancy among women and among men, 1970-2005

Introduction

Life expectancy at birth has increased from 58.3 to 65.5 in men and from 60.0.2 to 67.6 in women during 1970-75 to 2000-05 for the world as the whole (fig 1). In addition, the highest attained life expectancy has raised consistently through this period (fig 2). The highest attained LE, which was 72.1 for men and 77.6 for woman in 1970-75, has reached to 79.3 and 85.2 for men and women, respectively in 2000-05.

Figure 1

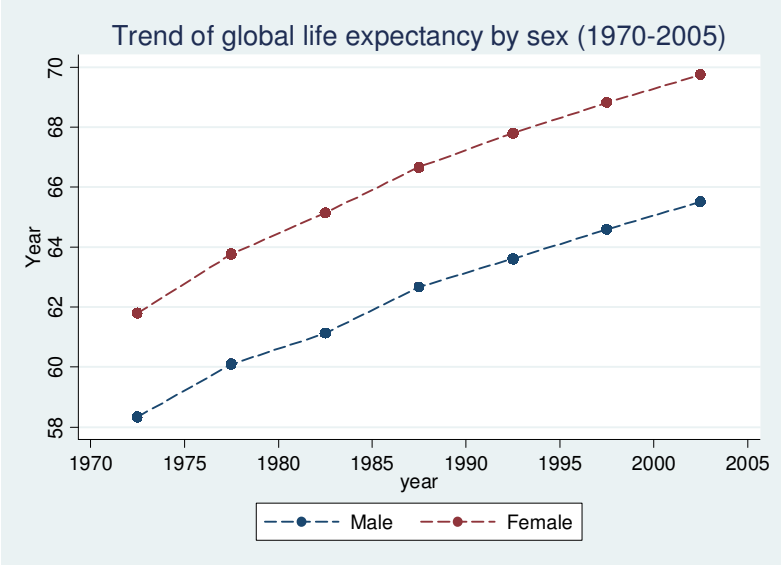
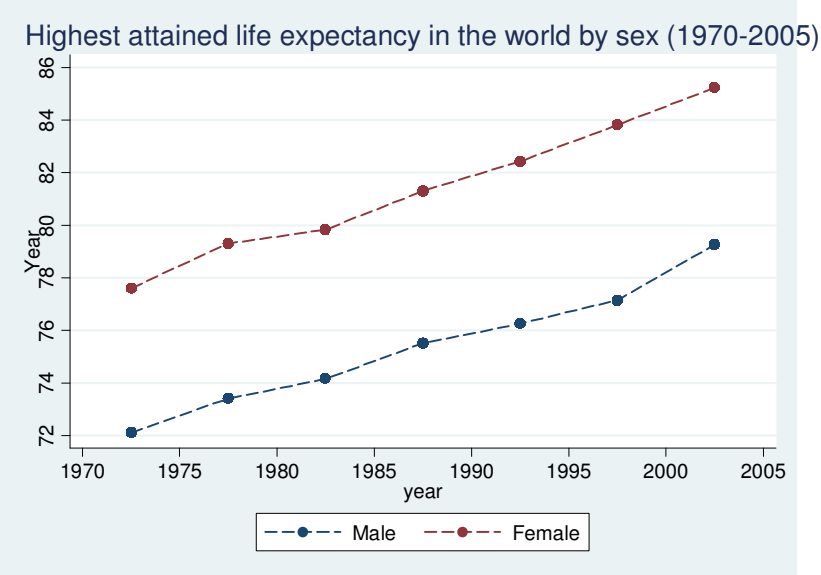


Figure 2



It is always important that we should not only look at the average of a health indicator, but also pay attention to the distribution of that health indicator. Life expectancy as one of the most comprehensive summary measures of health should not be exception to this matter.

Until now, when comparing the life expectancy between men and women, the fact that the average of LE has been higher in women than men has attracted more attention. On the other hand, it is of particular importance to see how life expectancy is distributed among women and among men.

The main objectives of this study are to compare global - across country- inequality in LE in men and in women and to define the contributions of WHO regions.

Methods and materials

Measure of global Inequality in LE

We would expect that all women and all men could - biologically - have reached the highest attained level of LE in their own sex at the time and any deviation from those levels could be avoidable and should be considered inequity. We use this simple fact in constructing our measure of inequality. Separate references are used for each sex instead of one single reference for both sexes, as it is not determined that which proportion of sex differences in life expectancy is due to the biological differences which is unavoidable and could not be regarded inequitable.

As we know, global life expectancy is simply the weighted average of countries' LEs where the weight is each country population size. We calculate the magnitude of inequality in the same way as global LE, the only difference is the deviation of each country's LE from the highest attained LE at the time is used instead of each country's LE. In other words, the absolute global inequality in LE is defined as the weighted average of the deviations of each country's LE from the highest attained LE at the time. The relative version of global inequality is constructed using dividing the absolute version by the corresponding highest attained LE.

Data

The estimates of life expectancy at birth by sex was taken from the United Nations 2006 revision of World population prospects for 7 five-year periods (1970-75 to 2000-2005). and population estimates for midpoints of these periods (1972, 1977, 1982, etc.) are also extracted (12). Data for life expectancy at birth by sex was available in 179 out of 193 WHO member states. The excluded 14 countries had small population and accounted for less than 0.01% of the world's population in 2002.

Results

Global inequality

From figure 3, we can see that inequality among women was 15.8 years during 1970-75. Although showing a decrease of over 1 year during one decade, the inequality stagnated during 1980-1995 and has raised again since then, so that it has became 15.5 years during 2000-05. The trend of inequality in men shows a constant decrease except for the last period during which it suddenly increased.

The important point is the inequality in LE has always been higher in women than men during the whole period of study ranging from 1.7 to 2.4 years.

The relative version of the inequality measure illustrates more or less the same pattern as absolute inequality (fig 4).

Figure 3

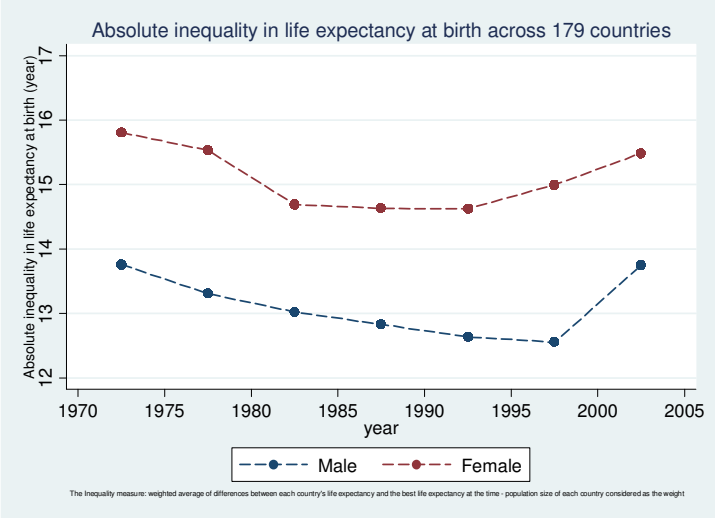
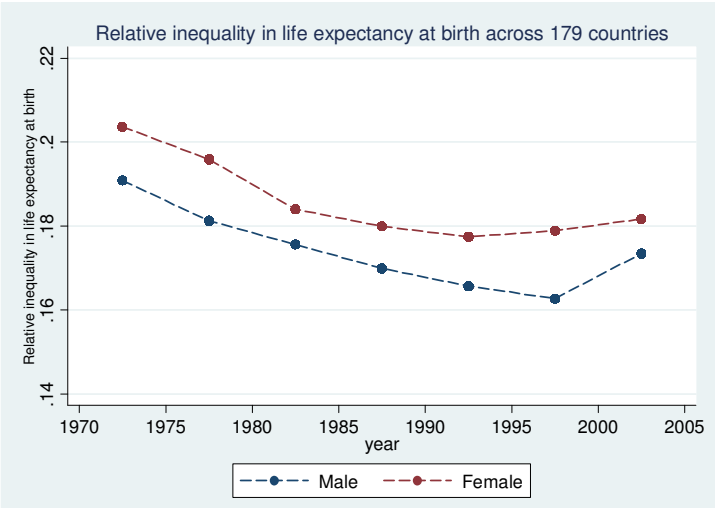


Figure 4



Regions role in the global inequality in LE

The contribution of each region to global inequality in LE results from the combination of two factors: the mean gap of LE in that region from the highest attained LE in each given period and the proportion of population size of that region to the world population in the same period.

The mean gaps of LE in the regions from the highest attained LE

As we see from figure 5, AFR has had the highest mean gap for both men and women; and the magnitude of this gap has increased over time, because the LE of women and men has not had the same pace of increase as that of the highest attained LE over time. In fact, the increase in LE in both of sexes in AFR in early period was followed with some decrease later (Figure 6). In addition, the magnitude of this gap has been increasingly higher in women than men, because, although LE of women has always been higher than that of men, the magnitude of this difference - between 2.5 and 3.8 years - has not been as big as the difference between the highest attained LEs in men and in women ranging from 5.5 to 6.7 years (figure 6).

Mean gap of LE in men and in women in AMR and EUR has always been less than 10 years. There was neither a change of mean gaps in men and in women over time in AMR, nor any trivial difference between mean gaps of both of sexes (figure 5), meaning that there has been the same patterns of the LE change over time and of the difference between LEs in women and in men as those of the highest attained LEs in women and men. (figure 6)

SEAR and EMR have had high mean gap for both men and women, although the magnitude of this gap has decreased over time reflecting the steep increase in life expectancy in both of sexes over time (figure 5). In addition, there has been a big difference between the mean gaps of LE in men and in women in these two regions more observably in the early/mid periods as the result of the similar life expectancy in both sexes (figure 6).

The magnitude of mean gap in WPR has been more close to AMR and EUR than the others showing also a slow decline over time which is a reflection of relatively rapid increase of LE in this region (figure 6).

Figure 5

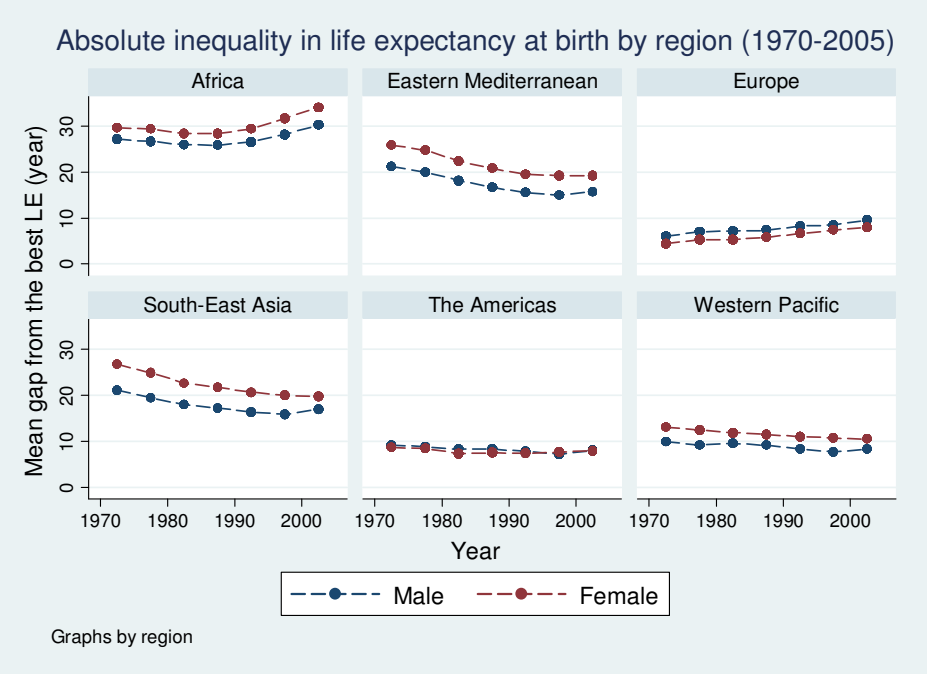
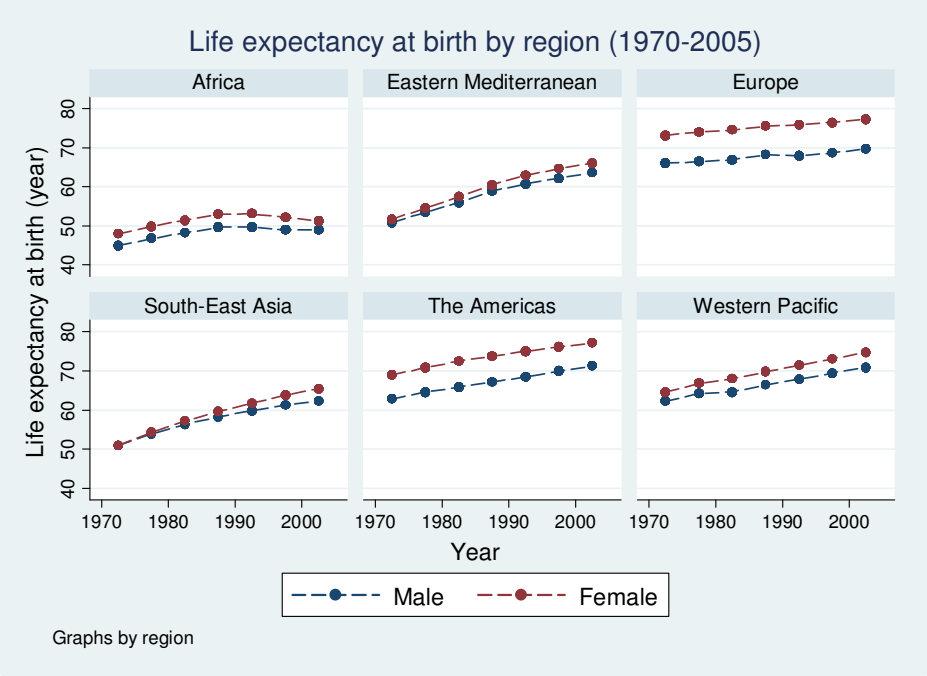


Figure 6



The regions population sizes

In general, the relative population size has increased in AFR, EMR and SEAR and decreased in EUR and WPR. There has been no significant change in the AMR's relative population size. The relative population size has been similar for men and for women in AFR, EMR and AMR. On the other hand it has been higher for women than for men in EUR and higher for men than for women in SEAR and WPR.

Contributions of regions to the global inequality in LE

As mentioned earlier, the combination of mean gap and relative population size in each region determines the magnitude of the contribution of that region to the global inequality in LE.

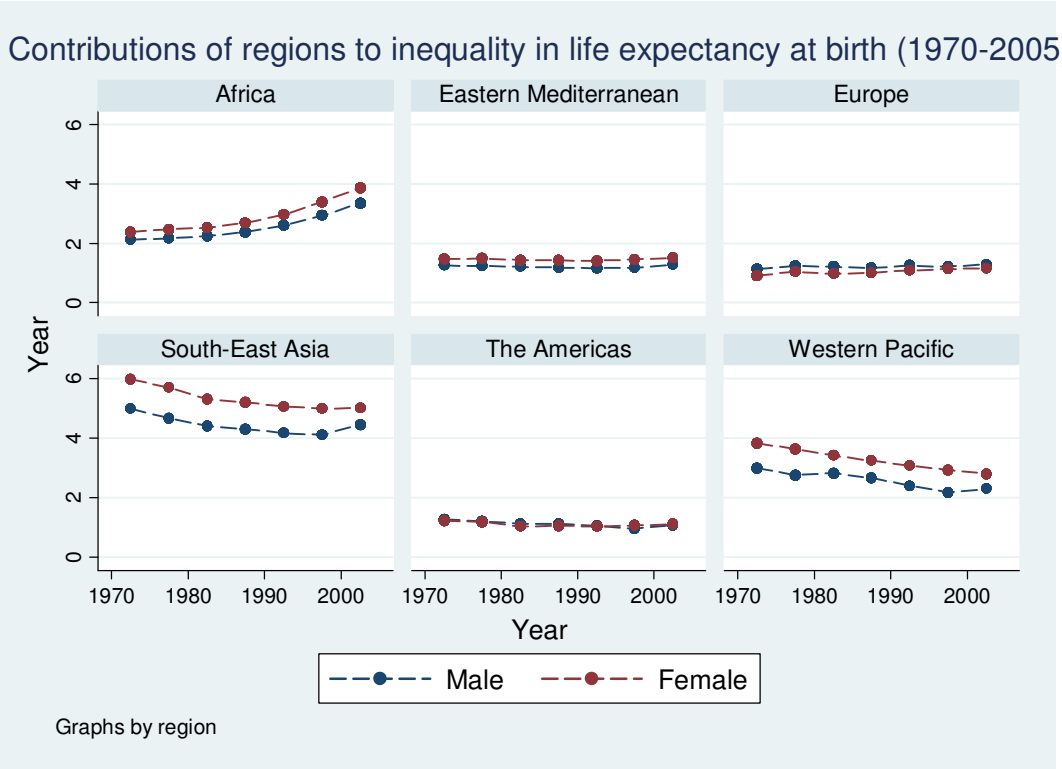
Given the high relative population size and the big mean gap, SEAR has had the biggest contribution to global inequality in LE both in men and women, although its contribution has decreased continuously during the period - except for the last period - reflecting the domination of the decrease of mean gap to the increase of its relative population size (figure 7). This region has had a main role in making global inequality be always higher in women than in men especially in early period due to a high difference between women' and men' mean gaps from their own best LEs; i.e. women have had the same LE as that of men in the early periods.
AFR's contribution to the global inequality in LE has increased significantly in men and in women over time due to the increase both in its mean gap and its relative population size. This increase in contribution is more dominant in women as the result of a recent significant increase in the mean gap of LE in the women of this region from the best LE making this region the main responsible for the increase of the global inequality in women during 1995-2005 and its stagnation in the decade before and also, along with SEAR and WPR, the cause of higher inequality in women than in men especially during 1995-2005. For instance, having only 11.4% of the world's female population, AFR was responsible for one forth of the global inequality in LE in women in 2005 (3.9 years out of 15.5 years).

AMR and EUR, as expected, with 0.9-1.2 years, have had the smallest contributions to the global inequality in LE in each sex. Their contributions have been more or less constant over time. In EUR, the increase of mean gap from best LE was largely compensated by the significant decrease in its relative population size. EUR is the only region where the mean gap in LE has always been lower in women than in men, although this difference has been very small all the time.

Although, the mean gap of LE in WPR has not been as high as those of regions like AFR and SEAR, it has had a relatively major contribution to the global inequality in both of sexes especially in the early period due to its large relative population size. However, its contribution to the global inequality has decreased over time due to the constant decrease in its relative population size and a small reduction in mean gap. WPR is also among the main regions which are the cause of higher inequality in women than in men.

Although having relatively high mean gap, EMR has contributed to a small extent – close to AMR's and EMR's contributions – thanks to its low relative population size. In addition, the reduction of its mean gap of LE over time has been compensated by the raise of its relative population size resulting in no change of its contribution over time.

Figure 7



The main points on regions role in global inequality in LE

1. The regions responsible for higher global inequality in women than in men: SEAR, WPR and AFR (mainly in the second half of the period)
2. The region responsible for the stagnation of inequality in women during 1985-1995 and then its increase during 1995-2005: AFR
3. Highest contributions made by: SEAR (high mean gap and high relative population size), WPR (high relative population size) and AFR (high mean gap especially the second half of the period)
4. Lowest contributions made by: AMR and EUR thanks to their small mean gaps in LE and EMR thanks to its small relative population size.
5. Difference in mean gap of LE between women and men:
   - High in EMR, SEAR and AFR (higher in the second half of the period)
   - No/Low in AMR, EUR (the only region with mean gap lower in women than men) and WPR