



Length of life inequality around the globe[☆]

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ABSTRACT

Inequality in the distribution of adult length of life – defined as age at death in the population aged 15 and over – is studied for virtually all countries of the world using a new database with over 9000 life tables covering a period of up to two centuries. The data reveal huge variation among countries and time periods in the degree to which the available years of life are distributed equally among the population. Most length of life inequality (about 90%) is within-country inequality. Our findings make clear that measures of length of life inequality should be adjusted for life expectancy to get a more relevant indicator of length of life differentials across populations. At similar levels of life expectancy, substantial differences in inequality are observed, even among highly developed countries. Expressed as premature mortality, inequality may be 35–70% higher in the most unequal countries compared to the most equal ones. Countries that reached a certain level of life expectancy earlier in time than other countries, and countries that improved their life expectancy more quickly than others, experienced higher levels of inequality.

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Introduction

One of the classic questions in the social sciences concerns the unequal distribution of resources and rewards among the members of societies. In some societies, life chances – in the broadest sense – are distributed more equally than in other societies. Socio-economic outcomes such as income, wealth, educational attainment and occupational status have been studied extensively to gain insight into the nature and causes of social inequality. For instance, there is a long research tradition that examines income distributions across societies and time (e.g. Bourguignon & Morrison, 2002; Firebaugh, 2003; Milanovic, 2005; UNDP, 2005).

Another well-established tradition analyzes cross-national differences in educational and occupational status attainment (e.g. Araujo, Ferreira, & Schady, 2004; Hout & DiPrete, 2006). However, the ultimate expression of differences in life chances among individuals – the variation in length of life – has received much less attention.

Differences in health and mortality have been studied extensively in the fields of social epidemiology and public health, but the focus of most of these studies has been on differences among social groups or regions within societies (e.g. Kunst, Groenhouf, & Mackenbach, 1998; Townsend, Davidson, & Whitehead, 1988; Wilkinson & Marmot, 2003). Only a few studies use differences in health and mortality among individuals – independent of group membership – as an instrument to study social inequality within and among countries. This is regrettable for at least four reasons. First, a long and healthy life is among the most highly valued and universal human goals, which makes it a useful indicator for comparing social inequality among societies that vary much in economic and cultural respects. Second, it has been argued that socio-economic resources like income and wealth are instrumental for reaching other, more essential, goals of which a long and healthy life is among the most important ones (Goesling & Firebaugh, 2004; Pradhan, Sahn, & Younger, 2003; Sen, 1985). By analyzing the variation in length of life among individuals and societies, insight into the nature and causes of inequality with regard to these more essential goals is obtained. Third, inequality in length of life is more directly linked to absolute deprivation than inequality of income,

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education, occupation, or wealth. Being poor may be a temporary state or be compensated by social redistribution mechanisms. More inequality in length of life, however, may imply that more individuals die prematurely; an irreversible situation. Fourth, the information needed for determining a country's degree of inequality in length of life – number of living persons and deaths by age group – is more widely available and straightforward than the information needed for other inequality measures (Cornia & Menchini, 2006; Pradhan et al., 2003). With inequality in length of life, therefore, a more comprehensive analysis of the causes of inequality is possible than with those other measures.

In this paper, we focus on adult length of life, defined as the total number of years persons over age 15 will live, or, similarly, the age at which these persons will die. We study the variation in the distribution of adult length of life within and among countries using a database with over 9000 life tables, covering almost all countries of the world and for many countries periods of over a hundred years. Using this database, we aim to gain understanding of the nature of the variation in adult length of life among countries and time periods in several ways. First, we establish total world life expectancy and length of life inequality by sex for 191 countries in the year 2000 and decompose this inequality into within-country and between-country components. Second, we disclose the full pattern of variation in adult length of life inequality within and among countries, by plotting length of life inequality against life expectancy for over 4500 country-year combinations. Third, we explore this pattern in more detail by (a) computing the magnitude of inequality differences within life expectancy categories, (b) comparing the size of inequality differences across selected countries, (c) highlighting changes in inequality in relation to changes in life expectancy within individual countries, and by (d) studying the association between length of life inequality and life expectancy over time.

Length of life inequality

At the individual level, length of life is simply the number of years a person has lived at the moment of her/his death. Length of life is thus synonymous with age at death. As not everybody dies at the same age, there is inequality in length of life among individuals. This inequality is in part due to genetic differences and intangible factors like good or bad luck, but also depends on the total amount of (nutritional, health and security) resources available in the society in which an individual lives and on the distribution of these resources among the population members. It is this last distributional component in which inequality researchers are mostly interested, because it potentially can be influenced by policy measures.

At the population level, length of life is closely related to life expectancy, one of the most widely used indicators of the performance of societies. Life expectancy of a population at a certain point in time reflects the average number of years an individual would live if (s)he would face during her/his entire life the age-specific mortality rates of this population at that point in time. In other words, it gives the expected average length of life based on the current mortality pattern. Because age-specific mortality rates change over time, life expectancy does not accurately predict the actual number of years an individual will live. However, because it combines information on the health situation of all age groups in a given year, it gives an excellent indication of the overall health performance of a society at a specific point in time.

Life expectancy is distributed very unequally among countries (e.g. Bourguignon & Morrison, 2002; Goesling & Firebaugh, 2004; UNDP, 2005; World Bank, 2005). According to Bourguignon and Morrison (2002), between-country variation in life expectancy

decreased steadily during most of the 20th century until the 1980s. Since then, an increase has been observed, due to deviating trends in sub-Saharan African countries (see also Becker, Philipson, & Soares, 2005; Goesling & Firebaugh, 2004; Schady, 2005). However, whether total world length of life inequality has followed the same pattern is difficult to say, because most research is focused on between-country variation and little is known about the relative size of the within-country component. Research on other forms of inequality has shown that, depending on the outcome considered the within-country component can account for less than 30% (income) but also over 80% (education) of total inequality (Araujo et al., 2004; Bourguignon & Morrison, 2002; Goesling, 2001). The available indirect evidence suggests that for length of life inequality the within-country component might be quite high, in the order of 70% (Pradhan et al., 2003; World Bank, 2005). If so, this would stress the importance of analyzing the way in which length of life is distributed within countries. In our analyses we will determine the size of this within-country component.

A two-peaked distribution

To illustrate what we mean by length of life inequality, Fig. 1 presents the distributions of length of life (or age at death) for men in three countries (Niger, Brazil and Japan) with different levels of development in the year 2000. These distributions show the number of deaths by age that we would observe in a birth cohort of 100,000 men if they were to experience the mortality pattern of the year 2000. For instance, in Niger about 1000 males of the cohort of 100,000 die at the age of 35, whereas at that age in Brazil about 500 die and in Japan only about 100. At the age of 80 we see a reversed pattern with about 3500 male deaths in Japan and about 800 in Niger, reflecting the fact that in Japan more males survive to this age than in Niger.

The differences in length of life inequality among these countries are clearly reflected in the distributions. In Japan the number of years lived by the males who died in 2000 are much more similar than in the other countries. The majority of Japanese males reach the age of 70 and die between 70 and 90, whereas in Niger and to a lesser extent also in Brazil, the ages at death show much more variation. Hence inequality in male length of life in 2000 was lower in Japan than in Niger and Brazil.

Fig. 1 also shows that the distribution of age at death generally has two peaks. The first peak indicates infant and child mortality. This peak is high in Niger and low in Japan, reflecting the strong reduction of infant and child mortality experienced by modernizing societies. From age 10 to 15 onwards, mortality gradually increases until a second peak is reached somewhere after age 65. After this peak, the number of persons who reach a higher age decreases

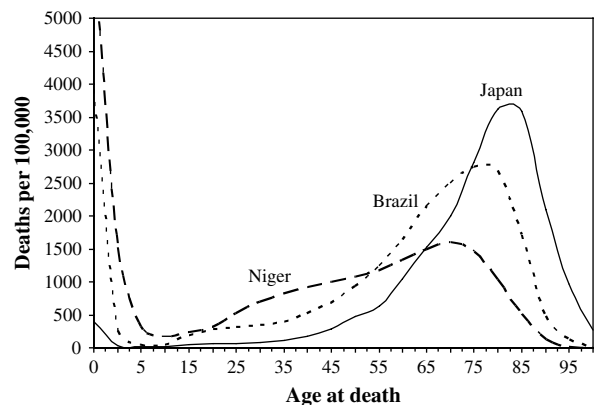


Fig. 1. Distribution of length of life for males in Niger, Brazil and Japan in 2000.

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