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Comment Victor R. Fuchs

In this chapter, Shripad Tuljapurkar uses mean age of death (derived from a period life table) to measure life expectancy (e_0) and the standard deviation of the age of death distribution to measure inequality. He focuses on "adult" mortality by limiting the standard deviation to the distribution of deaths from age ten on (S_{10}). He uses data from the United States, Sweden, and a few other high-income countries. His principal empirical findings are the following:

- Life expectancy at birth has increased appreciably since the Industrial Revolution, albeit at a slower pace in recent decades.
- Inequality in mortality, measured by S_{10}, has decreased; the rate of decrease has slowed in recent decades.
- Over time, there is a negative correlation between life expectancy (e_o) and inequality (S_{10}); the correlation has weakened in recent decades.
- Inequality in length of life is greater in the United States than in a subset of Organization for Economic Cooperation and Development (OECD) countries. Furthermore, there has been very little decline in S_{10} in the United States since 1960, unlike several other OECD countries that show substantial declines.
- While there is a correlation between education and age of death in the United States, the variation in length of life in the United States is much greater than the variation in length of life across education groups. It appears that socioeconomic disparities in general can explain only a small part of the inequality in length of life.

Comments

The mean and standard deviation are well-established statistics to describe a distribution. They are familiar and have desirable mathematical properties. But they are not the only statistics that are easily calculated; other measures can provide additional insights into questions about inequality in length of life. Life expectancy can be represented by the median age of death rather than the mean. Inequality can be described by the interquartile range rather than the standard deviation. Attention to the median and the interquartile range yields results that are at times similar to those of Tuljapurkar, but are at times strikingly different.

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Because the United States has a large heterogeneous population, inequality is calculated for whites in each of the fifty states.[1] Each state is treated as if it were a separate demographic entity to make more appropriate comparisons between the states and foreign countries, many of which also have relatively small populations. The comparison is limited to whites because of the large black-white differential in length of life (about five years), the large variation across states in the percentage of the population that is black, and the fact that the percentage black is much larger in the United States than in the other countries.

Within-state inequality of U.S. whites is significantly greater ($p < .001$) than within-country inequality in twenty-one "Western" countries.[2] This result adds support to Tuljapurkar's finding that inequality in the United States is greater than in other countries. Unlike Tuljapurkar's results, however, the mean interquartile range in the states (as well as in the other Western countries) declined from 1970 to 1980 and from 1980 to 1990. Between 1990 and 2000, the mean interquartile range for the twenty-one countries fell by an additional 0.8 years. State data are not available for 2000, but for U.S. whites as a whole, the decrease from 1990 to 2000 was 0.9 years. This suggests that the gap between the states and other countries was probably about the same in 2000 as in 1990.

The greater inequality in the United States is also evident in the ages at which 25 percent, 50 percent, and 75 percent of the cohort are dead, according to period life tables. By comparing the fifty states with the twenty-one countries at these different levels of survivorship, we find that the greater inequality in the United States, is the result of two disparate phenomena. The age at which 25 percent of the cohort is dead is substantially lower in the states than in the other countries, indicating higher mortality rates in the states at younger ages. By contrast, the age at which 75 percent of the cohort is dead is *higher in the states* than in the other countries, indicating lower mortality rates in the states at older ages. Both the relatively higher U.S. mortality rates at younger ages and the relatively lower rates at older ages explain the greater inequality in length of life in the states. It should also be noted that the age at which 50 percent of cohort is dead is similar in the states as in the countries. That is, white median life expectancy in the average state was about the same as median life expectancy in the average Western country in 2000.

Tuljapurkar's finding of a negative correlation between inequality and life

1. National Center for Health Statistics, *U.S. Decennial Life Tables for 1969–71,* volume 2, *State Life Tables* (Rockville, MD: National Center for Health Statistics, 1985); *U.S. Decennial Life Tables for 1979–91,* volume 2, *State Life Tables* (Hyattsville, MD: National Center for Health Statistics, 1985); *U.S. Decennial Life Tables for 1989–91,* volume 2, *State Life Tables* (Hyattsville, MD: National Center for Health Statistics 1998).

2. "Western" countries are Australia, Austria, Belgium, Canada, Denmark, England, Finland, France, Germany (West), Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand (non-Maori), Norway, Portugal, Spain, Sweden, Switzerland, and Taiwan.

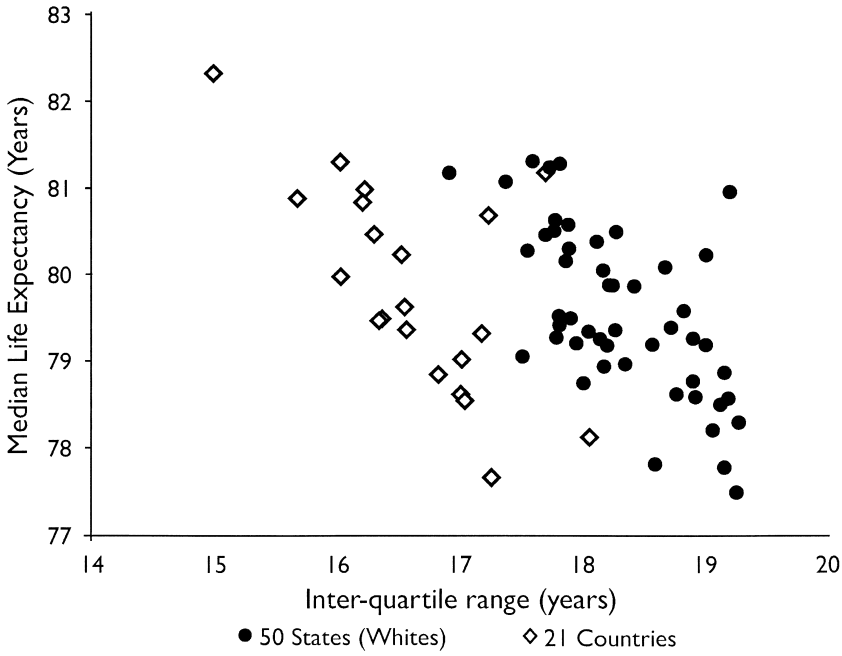

Fig. 6C.1 Scatter diagram of inequality and life expectancy, 50 states (whites) and 21 Western countries, 1990

expectancy over time is also evident in cross section using the interquartile range for inequality and the median age of death for life expectancy. The correlation across the fifty states is –0.63, and for the twenty-one countries, it is –0.64. (See figure 6C.1). This relationship between inequality and life expectancy results from the fact that death rates at younger ages (captured by the age at which 25 percent of a cohort is dead) drives both life expectancy and inequality. The correlation with median life expectancy is almost perfect: $r = 0.98$ for the states and 0.96 for the countries. Its greater importance for inequality than the age at which 75 percent is dead can be seen in figure 6C.2. All these results can be traced to the greater variability of death rates at younger ages than at older ages across states and across countries. The coefficient of variation (standard deviation divided by the mean) across the states for the age at which 25 percent is dead is 1.7 percent; for the age at which 75 percent is dead is only 0.8%. Across the countries, the coefficients are 2.1 percent and 1.2 percent, respectively.

In calling attention to the large inequality in length of life that still prevails in the United States—and other high-income countries—Tuljapurkar is on the right track; the matter could be put even more strongly. Consider the following situation in the United States. The mean age of death of white college graduates is no more than four or five years greater than that of white high

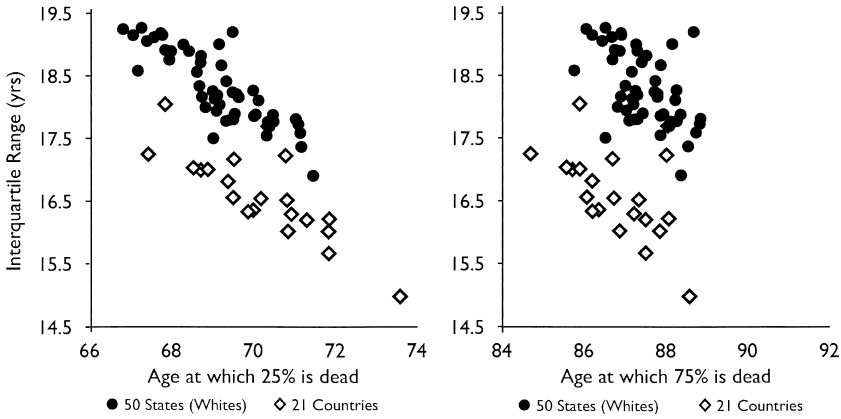

Fig. 6C.2 Scatter diagrams of relationship between interquartile range and age at which 25% is dead and 75% is dead, 1990

school dropouts. By contrast, the mean age of death of the one-fourth of white cohort who live the longest is about twenty-five years greater than the mean age of death of the one-fourth who have the shortest lives. A major challenge for social and medical scientists is to explain this inequality in length of life. A good starting point would be to explain differences in the age at which 25 percent is dead across states and across countries.