

Death expectancy? For studying health inequality?

What's the opposite of life expectancy? Well I think it might be death expectancy, the area above, rather than below, the survival curve. Say we have a lifetable where the last age is 110+. There are essentially 111 years of life in the lifetable. So death expectancy at birth is 111 minus life expectancy. I am sure you could derive this directly from lifetable elements and demographers have this sorted already. Let me know. Also note I took inspiration from this paper that looked at 100 minus life expectancy.

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Why the interest in death expectancy?

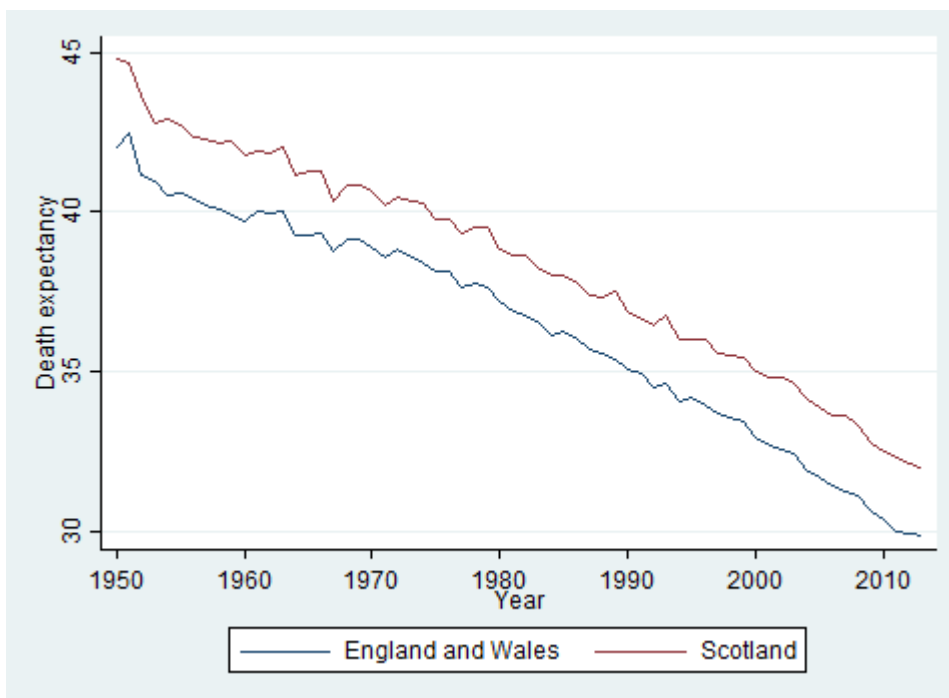
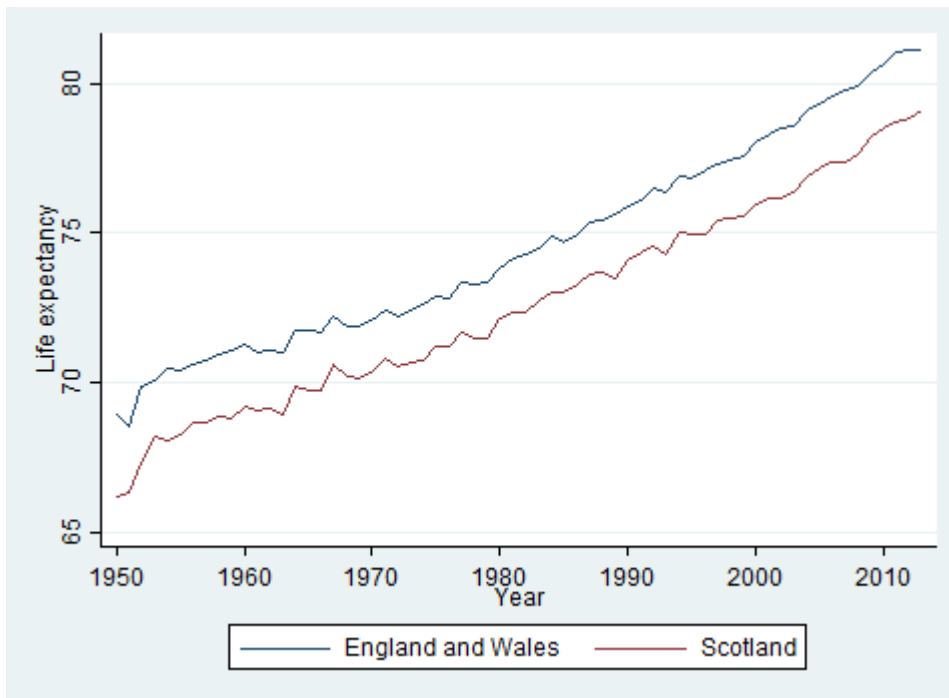
Has health inequality widened over time? This is a surprising complex question to answer. Do you mean on a relative or absolute scale? Are you studying the positive (good health) or its opposite (bad health)? How to account for changes in overall health? The list goes on and the choices made can affect the results. Life expectancy is a positive expression of death rates. Some people might say that the age adjusted mortality rate is its opposite, it being widely used in health inequality studies. But I reckon it is death expectancy.

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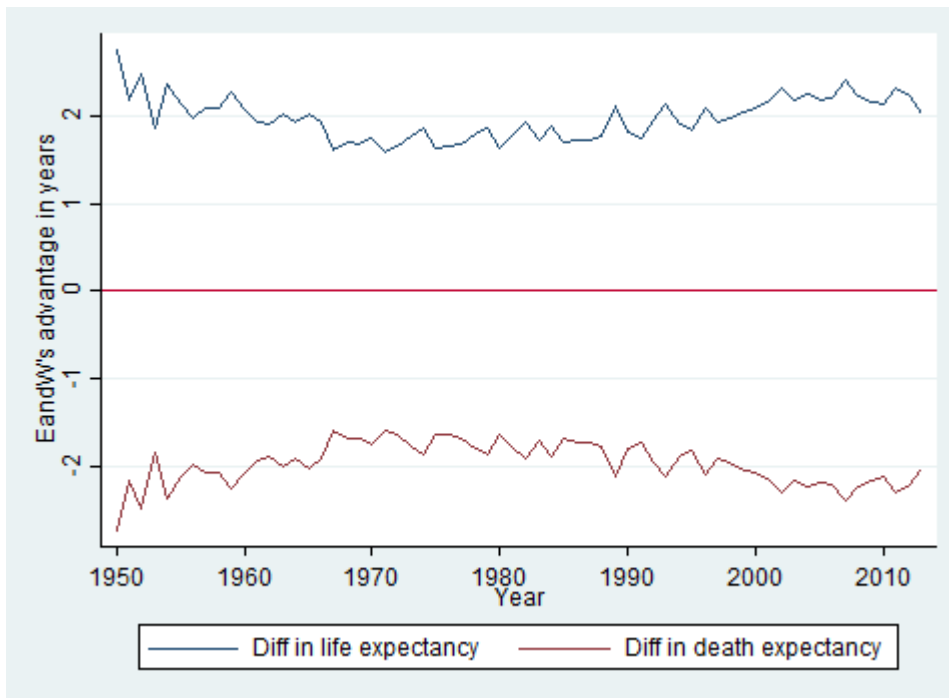
Let's see why it matters.

Let's take a simple example, the difference between England and Wales and Scotland. I know this is not health inequality across socioeconomic groups but the points arising are universal to comparisons of health. The figure below shows trends in life expectancy, with England and Wales' advantage decreasing before widening again after the 1980s. Obviously the picture for death expectancy is just the reverse. The third figure shows the first two in terms of absolute difference.

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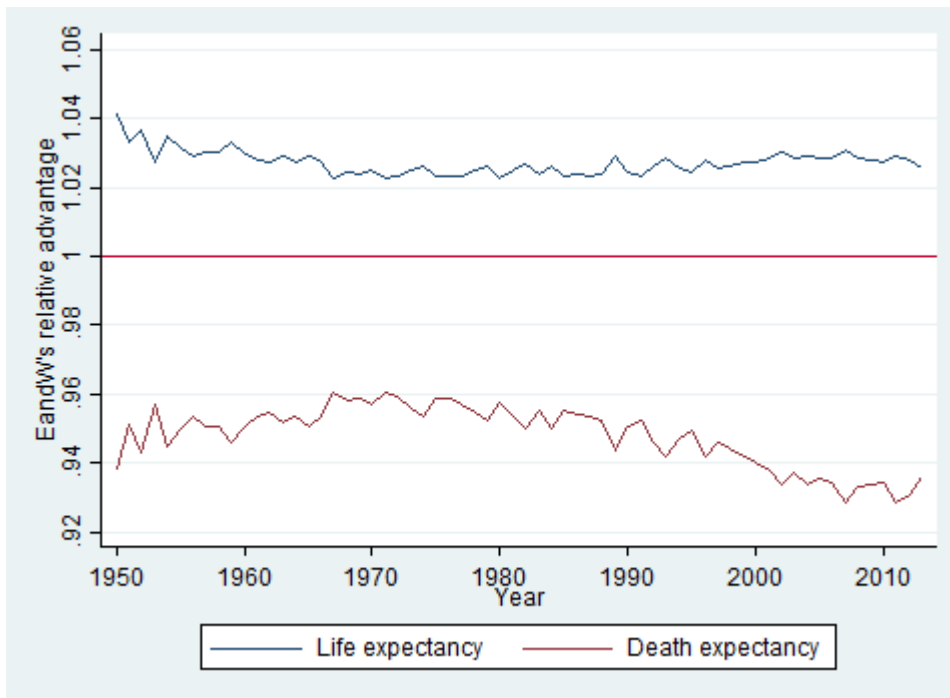


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But look at the relative advantage of England and Wales below. The recent downturn in Scotland's comparative health isn't seen for life expectancy whereas death expectancy does show it. Note it doesn't matter if you look at it in terms of Scotland's disadvantage, the pattern of results is the same. If we took the relative life expectancy result at face value then the conclusion might be that not much has changed between the countries. This is clearly not the case as the first two figures show. A clear explanation of what is going on here is presented in this paper.

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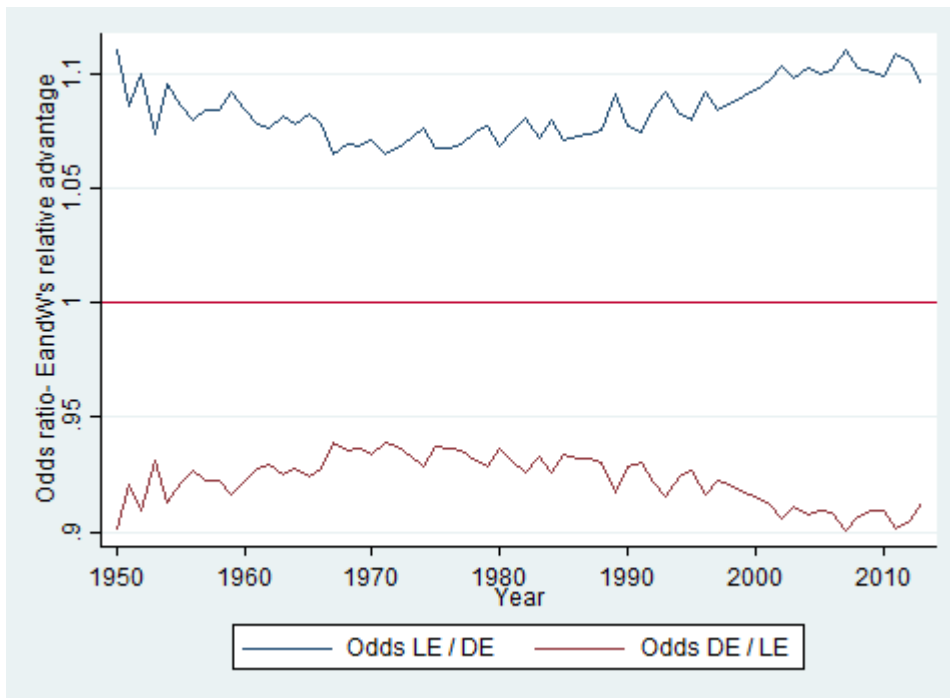


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Solutions?

The authors of the paper argue that all results should be presented, and it is hard to disagree. They advocate diagrams including all combinations (relative and absolute difference for positive and negative health with the mean level of health shown). See also [this](#) and [this](#). Personally I find such graphs a bit busy. Using the odds ratio overcomes the negative / positive health problem for relative measures as shown below but not other issues.

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Data and code

My data source is the Human Mortality Database. You have to register but the data is free. I have put the code used to construct the figures in this Stata file so you can replicate my work. Please tell me about any mistakes.

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Funding and disclaimer

The MRC/CSO Social and Public Health Sciences Unit is funded by the Medical Research Council and the Scottish Government Chief Scientist Office. The views expressed are not those of the Medical Research Council or the Scottish Government.



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