

# **The Human Development Index and life expectancy prior to birth**

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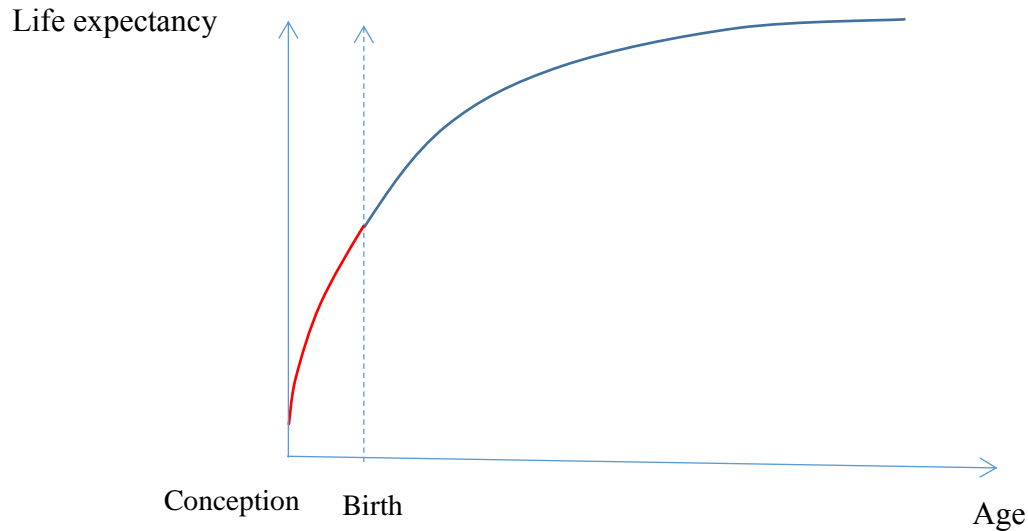
THIS IS A SYNOPSIS OF THE POSTER DISPLAYED AT THE AEA MEETING IN  
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**Overview:** Life expectancy is a component of the UN's Human Development Index (HDI), together with years of schooling and income per capita. At present, estimates of life expectancy are available at birth and at each year after birth, but no estimates are available prior to birth. This paper calculates life expectancy prior to birth by taking into account interruptions of pregnancy, both natural (miscarriages) and artificial (abortions), and studies how doing so affects the Human Development Index. The HDI falls both directly as a result of a lower life expectancy, and indirectly as a result of the fact that individuals who did not manage to arrive alive to birth enjoy neither schooling nor income. Consider for example the US: life expectancy at birth is about 79 years, but is estimated to fall to 47 years prior to birth. Consequently, the US's HDI with life expectancy measured at birth is 0.94, but drops to 0.59 prior to birth. Country rankings too change, so that Germany, a country with relatively few abortions, replaces Norway as the country with the highest HDI in our sample.

## **Methodology**

The fundamental idea is to extend our understanding of the relationship between life expectancy and age to the period prior to birth – see the red extension below:

Figure 1: Life expectancy before and after birth



Our approach consists in aggregating individuals who die before and after birth. We use the following approximation:

Life expectancy prior to birth =

$$\frac{\text{Miscarriages} + \text{Abortions}}{\text{Official deaths} + \text{miscarriages} + \text{abortions}} \text{LE if death occurs in the womb} +$$

$$\frac{\text{Official deaths}}{\text{Official deaths} + \text{miscarraiges} + \text{abortions}} \text{LE at birth (i.e. if death occurs at or after birth)}$$

where LE = life expectancy

We take LE prior to birth to be -0.5 (3 months into pregnancy); LE at birth, official deaths and abortions are taken from various UN data sources, as are the HDI figures used later, and are mostly for the year 2012. To estimate miscarriages, we assume that miscarriages constitute 15% of pregnancies (see e.g. Rai and Regan, 2006, The Lancet) and use UN data for live births together with the relationship pregnancies = live births + miscarriages + abortions. This is a first approximation and ignores the (relatively few) deaths due to other reasons (e.g. stillbirths).

### An example: life expectancy in the US

Using the official number of deaths in the US (i.e. the death of those individuals who died prior to birth) at 2,465,936, we can calculate life expectancy prior to birth and compare it with that at birth:

Figure 2: life expectancy in the US at birth and 6 months prior to birth

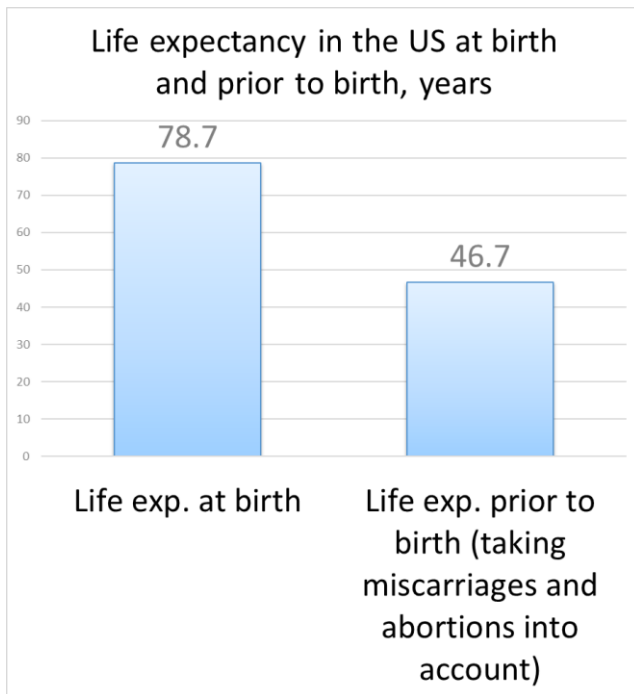
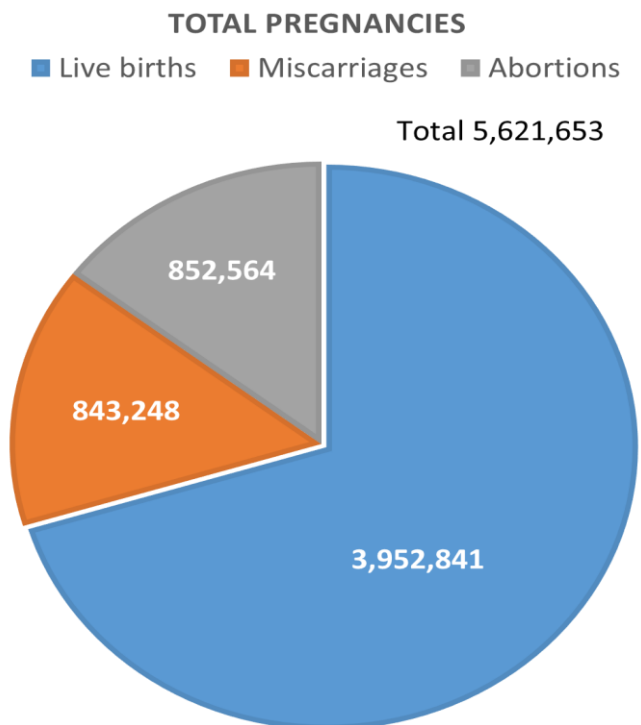


Figure 3: US pregnancies split into live births, abortions and miscarriages

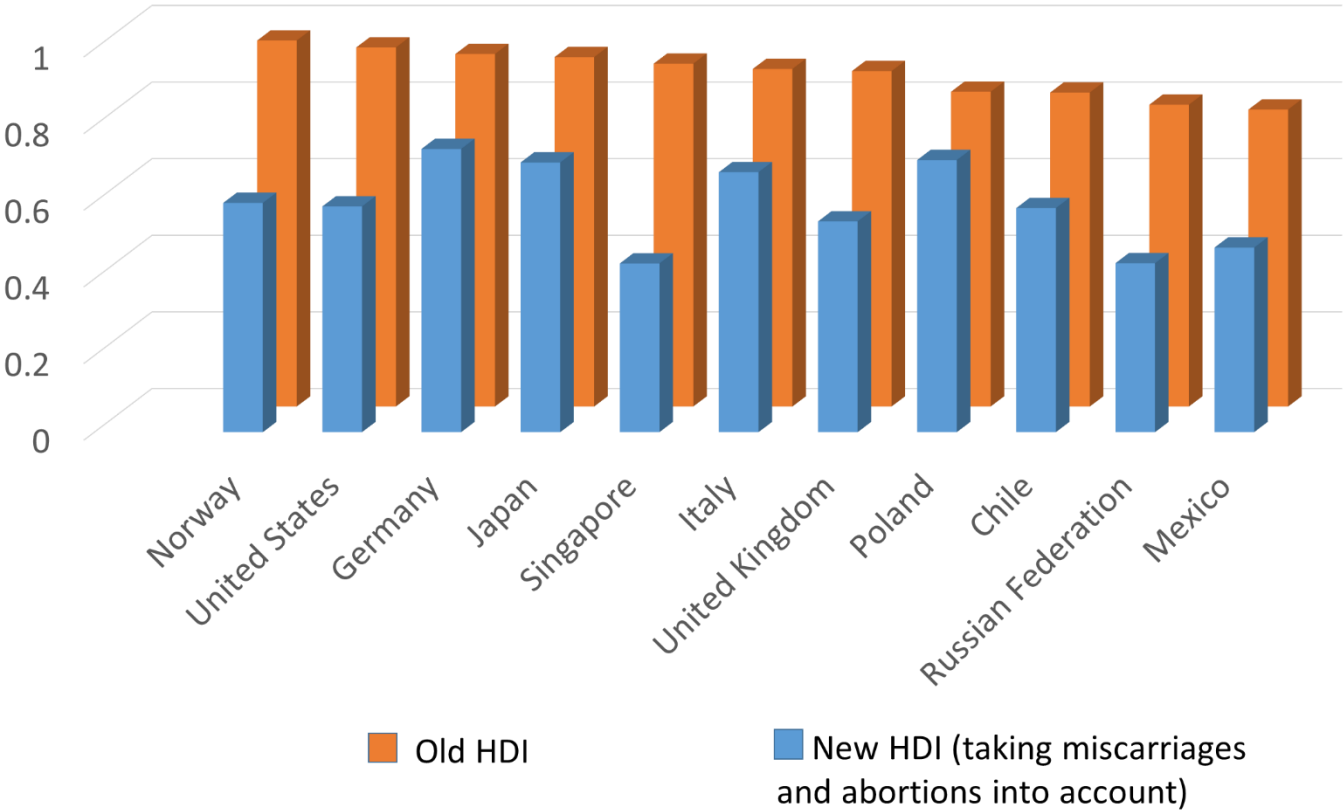


**Results**

Replacing life expectancy at birth with life expectancy prior to birth within the HDI leads to the following reduction in the HDI:

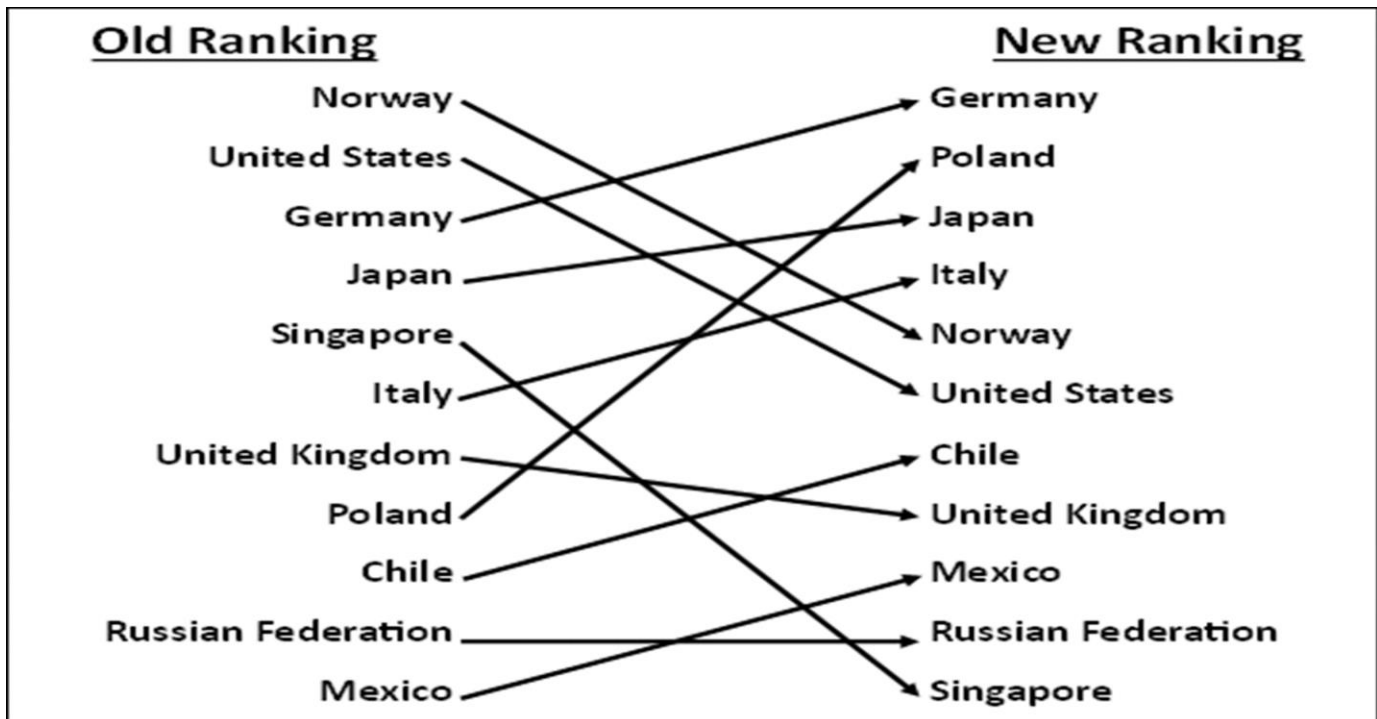
Figure 4: Comparing the HDI using life expectancy prior to birth with the HDI using life expectancy at birth

The HDI and life expectancy prior to birth



Furthermore, country rankings change, as countries with relatively more abortions drop down in the rankings:

Figure 5: Old HDI ranking and new HDI (taking miscarriages and abortions into account) ranking in the sample above



The decline in Singapore's ranking in our sample is very noticeable and is due to the large number of abortions carried out there. Germany replaces Norway as the highest ranking country in the sample, due to the relatively low number of abortions.

### Conclusion

There is a clear policy implication that a lower number of interrupted pregnancies will increase the HDI when life expectancy is measured prior to birth. This is probably not controversial in the case of miscarriages, but it is in the case of abortions. The US public, for example, is split roughly 50/50 between pro-life and pro-choice supporters (Gallup 2014).

Compared to other studies in the HDI literature, this approach is innovative in that it argues that we are failing to include a section of the population, i.e. those who died as a result of miscarriages or abortions.

Important data limitations need to be borne in mind. Abortion figures are more reliable in some countries than others, and the miscarriage data needs to be improved considerably by obtaining estimates for example using regression analysis.

## **Key references**

Various UN data sources, see [www.data.un.org](http://www.data.un.org)

Rai, R. and Regan, L., 2006. Recurrent miscarriage. *The Lancet*, 368(9535), pp.601-611.