Measuring inequality: Lorenz curves and Gini coefficients – Doing Economics

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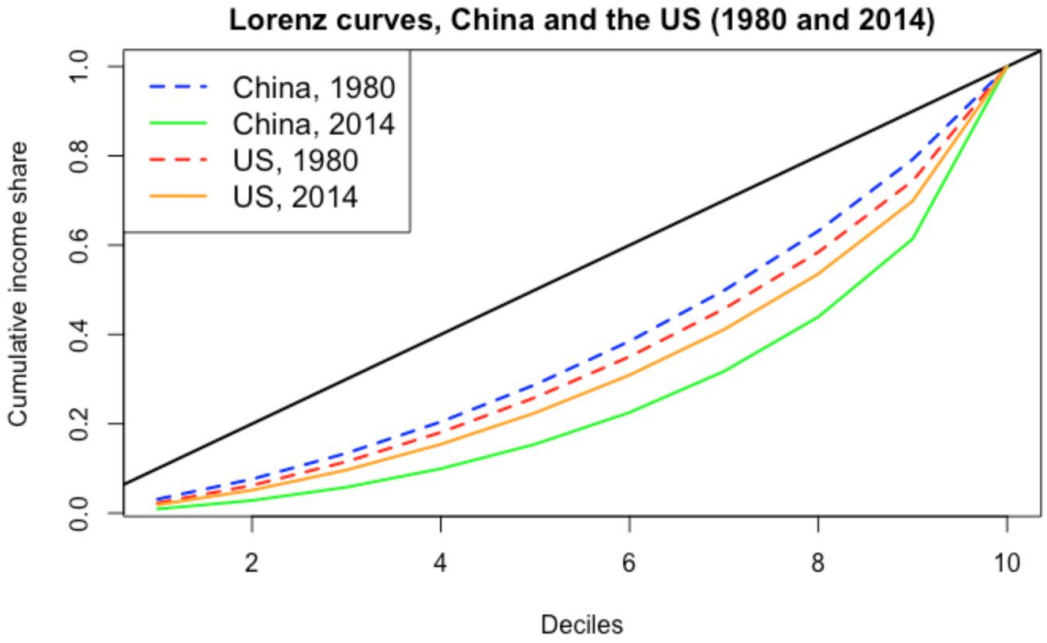
5.1 Measuring income inequality

"Income inequality" is the extent to which income is distributed unevenly across people or across households. Here, the most commonly used measures—the Lorenz curve, the Gini coefficient, decile ratios. The Lorenz curve is often accompanied by a straight diagonal line with a slope of 1, which represents perfect equality in income or wealth distribution; the Lorenz curve lies beneath it, showing the actual distribution. The area between the straight line and the curved line, expressed as a ratio of the area under the straight line, is the Gini coefficient, a measurement of inequality.

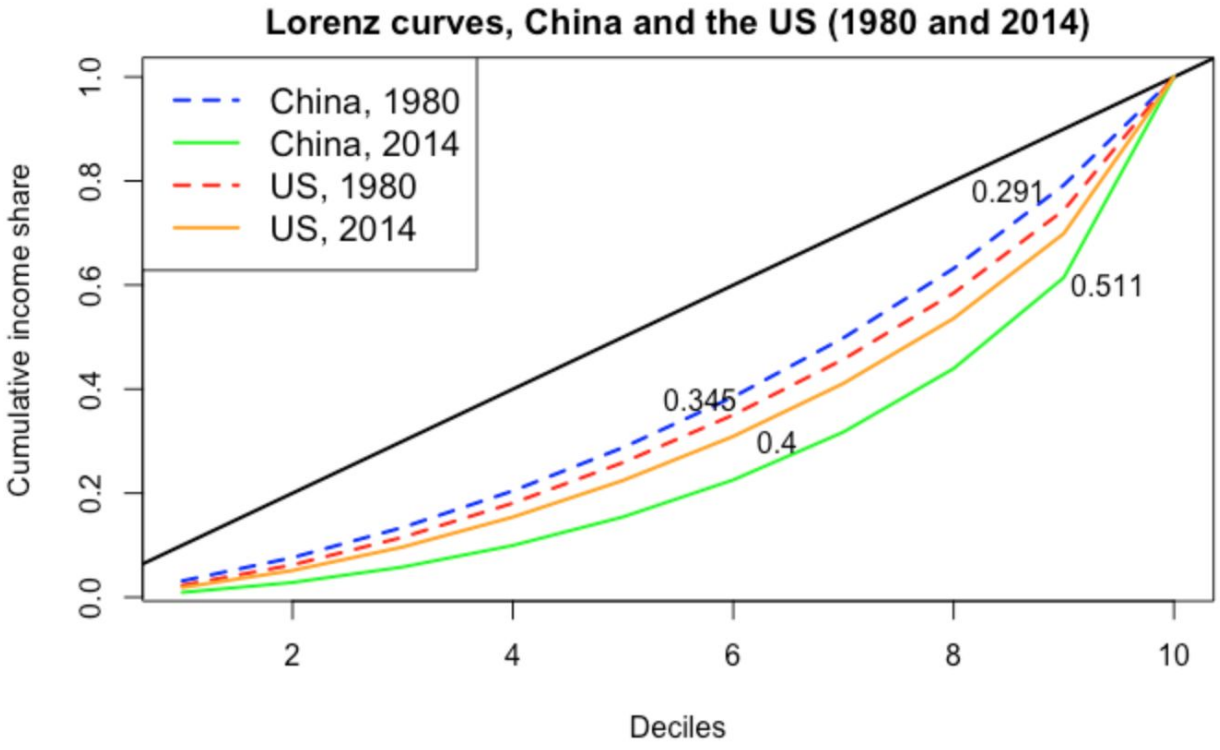
2. *For the plot,we choose two countries(China and US) and look at their Lorenz curve for the years 1980 and 2014.*



3. *From the chart, it is clear that income inequality has risen in both countries over time. The blue line Lorenz curve shows that the income distribution of China was less unequal to that of the USA, but looking at the Greenline we can say that over the years China has surpassed the USA. Income inequality has grown fastly in China than in the USA. China's rapid economic growth over an extended period has been accompanied by a sharp rise in income inequality. The top 1 percent of earners in America now take home about 20 percent of the country's pre tax national income, compared with less than 12 percent in 1978, according to the research the economists published at the National Bureau of Economic Research. Over the same time in China, the top 1 percent doubled their share of income, rising from about 6 percent to 12 percent. While that suggests that China and the U.S. are experiencing growth of inequality in tandem, there's one major difference, which suggests the problem may be direr on American soil. That regards how the bottom 50 percent of income earners are taking part in – or in the case of the U.S., losing out on – the country's economic growth.*

By a research we came to know that America has experienced a complete collapse of the bottom 50 percent income share in the U.S. between 1978 to 2015. In contrast, and despite a similar qualitative trend, the bottom 50 percent share remains higher than the top 1 percent.

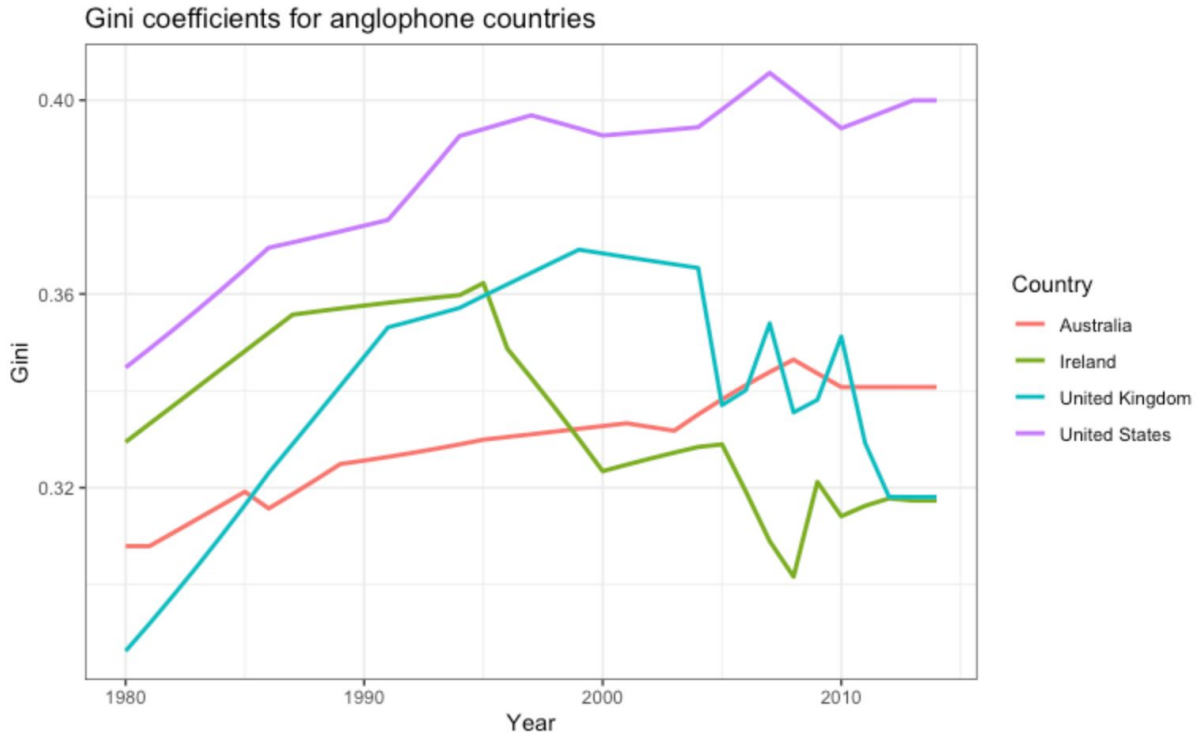
4. *Now, to compare the income distribution between these two countries we calculate the Gini coefficient for each.*



5. *Calculating Gini coefficient for all the countries and all years*

To look at the trend of global income inequality we calculated the Gini coefficient for all the countries and all the years from the dataset. From this calculation we came to know that the average Gini coefficient is 0.46, the maximum is 0.74, and the minimum 0.18. We can also see that some of the eastern European countries were extremely equal before the fall of communism and some of the African countries with a very high Gini coefficient.

For the plot we chose four anglophone countries: the UK, the US, Ireland, and Australia, we obtained the following result.



From the chart, it is observed that how the Gini coefficients are varying over the years. Australia has seemed to face an increase in income inequality over the years. In the early 2000s, the Gini coefficient of the UK and Ireland seemed to be decreasing, and later the both came to the same level. In the US it seems that the Gini has always been higher in comparison to the other three countries and it has also seemed to be increasing at a higher rate.

6. *The interdecile ratios are calculated as the ratios between incomes of various deciles of the income distribution. For example, the 90/10 ratio takes the ratio of the top 10% of incomes (Decile 10) to the lowest 10% of incomes (Decile 1) and similarly, the 90/50 ratio takes the ratio of the top 10% of incomes to the middle 10% of income (Decile 5). A 90/10 ratio of 5 means that the richest 10% earns 5 times more than the poorest 10%. The higher the ratio, the higher the inequality between these two points in the distribution.*

By putting different variables other than the Gini coefficient we can see that countries that rank highly on the Gini coefficient also generally rank highly on ratio measures. There are, however, some exceptions. Slovenia, for example, while being the most equal country in terms of the Gini coefficient in 2015, was only the 5th most equal country in terms of the 90/10 ratio. The potential differences in rankings of different measures mean it is important to look at more than one measure. The Gini coefficient is an overall measure of a distribution that may mask extreme inequalities between certain groups of the population.

7. *The others ways to measure income inequality we have choose to present here are following:*

- Share of income going to the top 1% : This measure shows what percent of national income is going to the group of the richest. Larger values indicate that the very rich have a larger share of the income, and that there is therefore more inequality between the very rich and the rest of society. However, this is a narrower measure of inequality than the Gini coefficient because it only tells us about how the very rich are doing.

- Share of the population living in relative poverty : This measure shows how wages and salary are received in a population. The indicator used is the ratio of earnings at the top decile (the person 10 percent from the top) to the median earnings expressed as a percentage. This is a measure of how far the distribution of earnings is spread out at the top. Larger values indicate that a certain group of people especially the richest are getting higher wages and salary from a median salary.

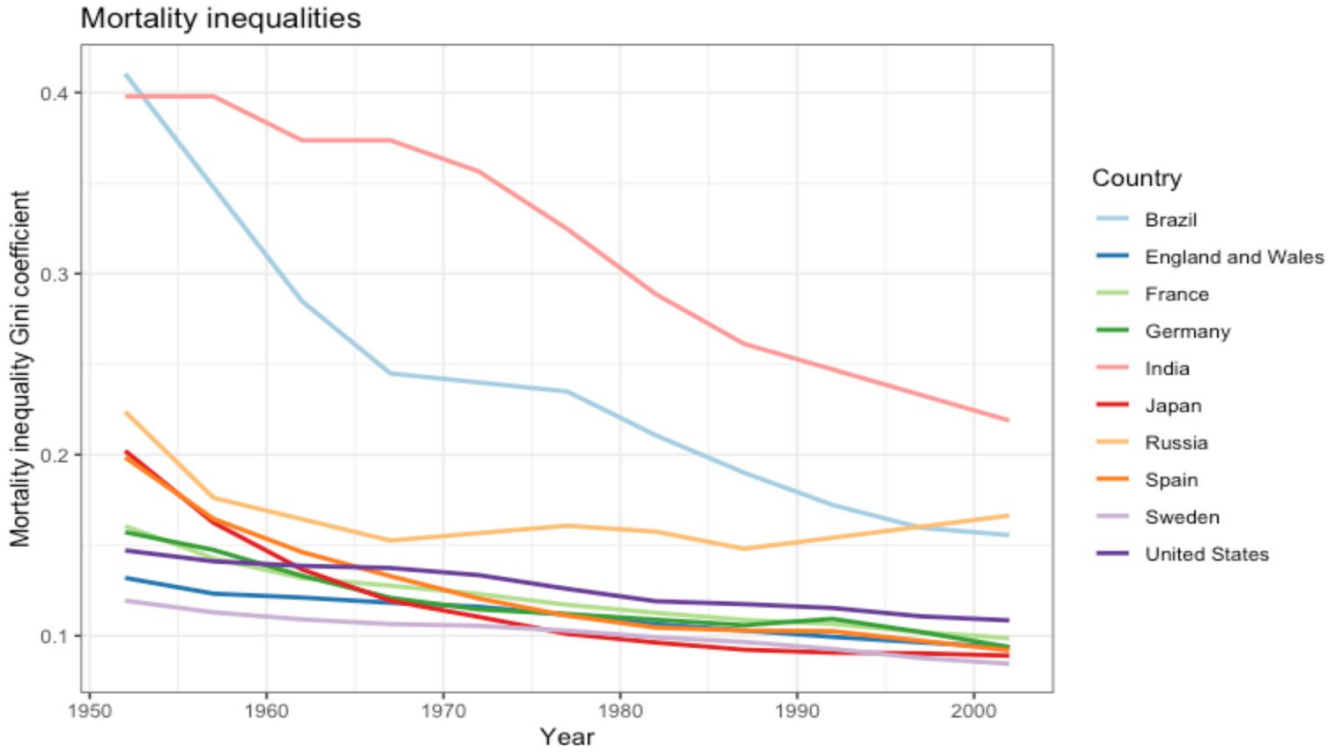
Now, we choose two countries Germany and the UK to see how these measures of income inequality tell us about them. We can see that the Gini coefficient of Germany is below 0.3 which is quite nice and the earnings of the top decile is quite high. Whereas for the UK we can see that its Gini coefficient is above 0.3 which is higher than Germany and also the earning of top decile is higher in the UK. From this we conclude that the UK is quite unequal compared to Germany.

5.2 Measuring other kinds of inequality

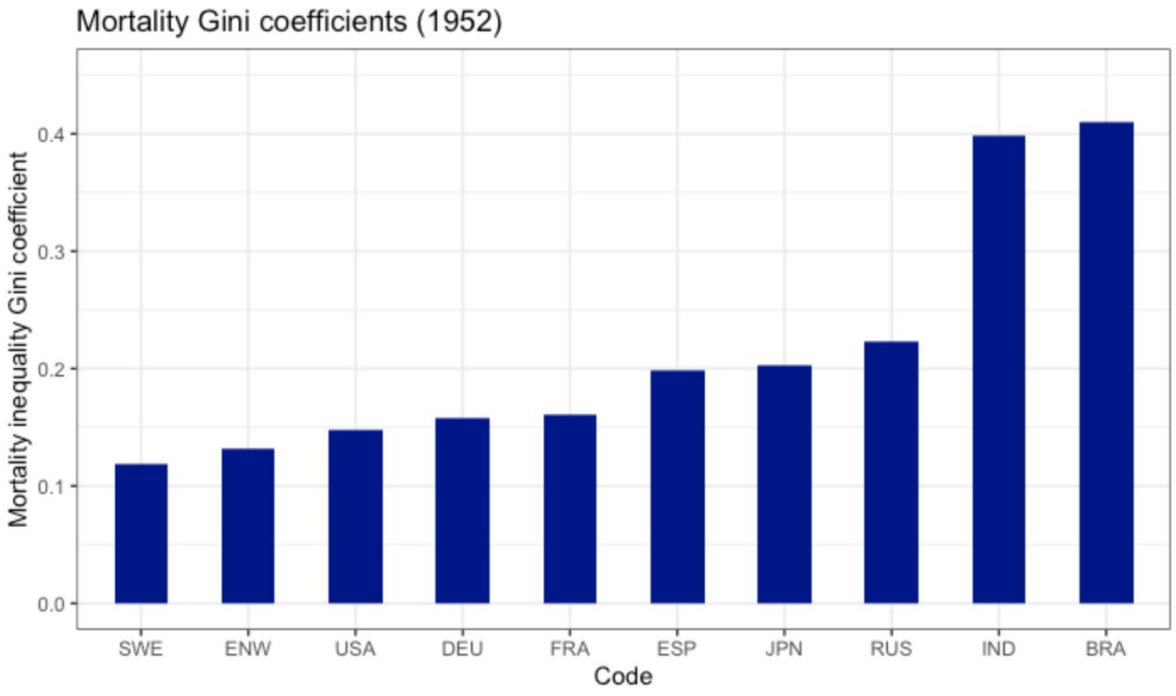
There are many ways to measure income inequality, but income inequality is only one dimension of inequality within a country. To get a more complete understanding of inequality within a country, we see in other areas in which there may be inequality in outcomes. Here, we focus on two particular areas:

1. Health inequality
2. Gender inequality in education

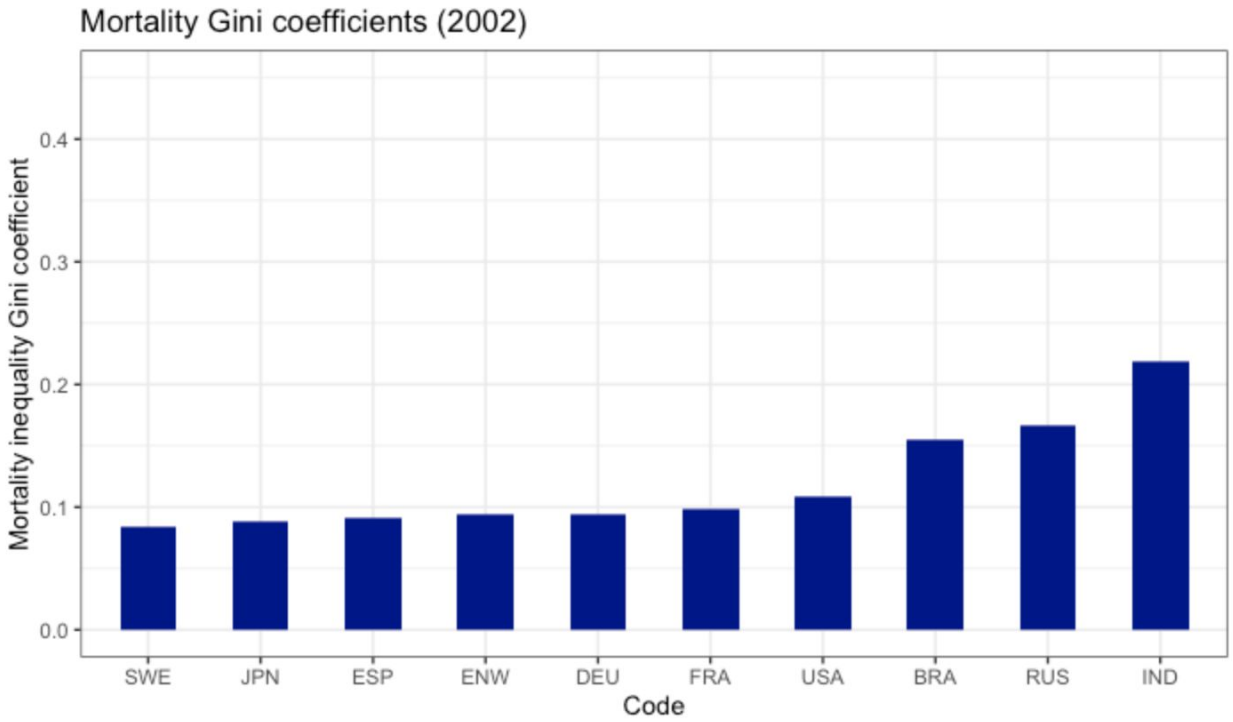
1) First,we look at mortality inequality Gini coefficients for 10 countries around the world to see the trend of health inequality from 1952–2002.By plotting a chart that contains all ten countries, we obtain the following results:



2. *a) Gini coefficients by country for 1952:*



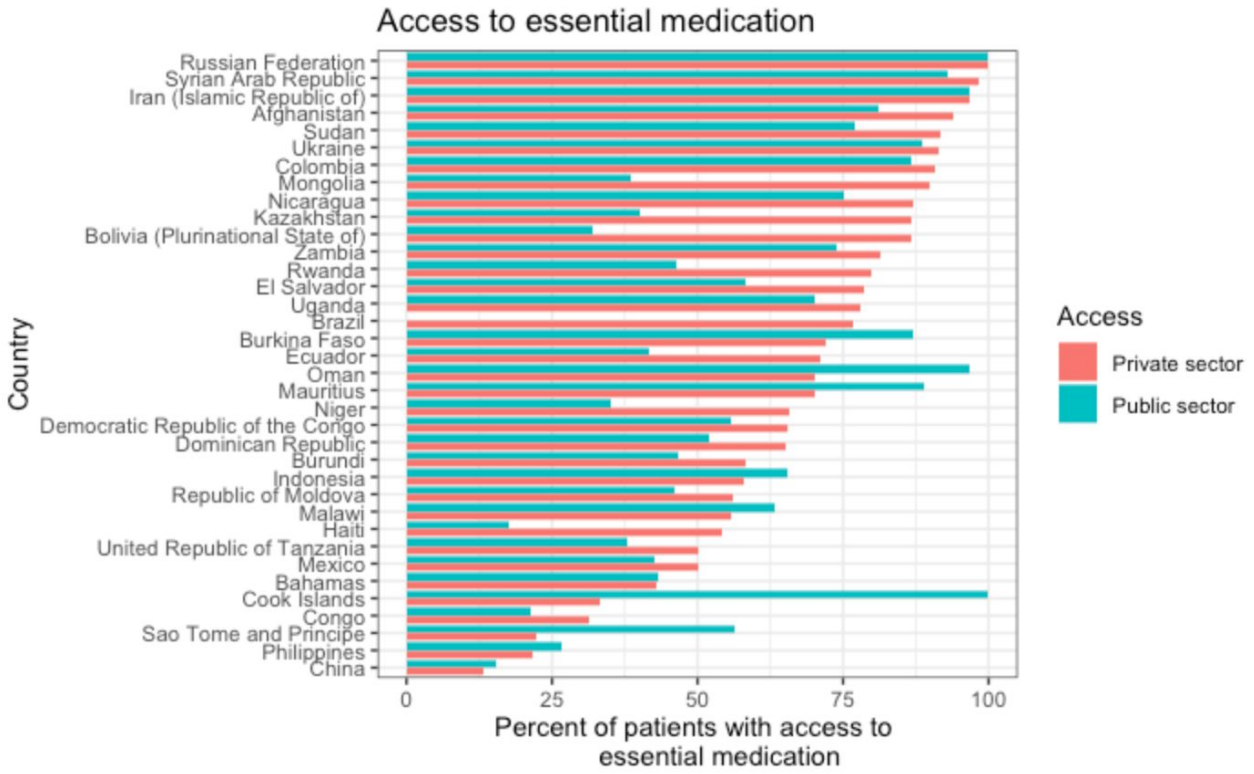
b) Gini coefficients by country for 2002:



c) From the above given two charts we can say that coming from 1952 to 2002, mortality inequality has fallen for all the countries and also the rankings of countries are different. Japan, for example, moved up five places in the ranking to become the second most equal country in 2002. Likewise, India has moved from second last to the last position. The rapid economic development in Japan has led to rising life expectancy. Living to old age is now the norm in Japan rather than a privilege enjoyed only by the rich. The rising proportion of elderly voters has contributed to policies aimed at improving elderly care, which has reduced the variation in life expectancy. The United States, on the other hand, dropped four places to become a relatively less equal nation in the group. The high costs of healthcare may prevent poor people from accessing treatment, especially if uninsured. It is more likely for disadvantaged groups in society such as minorities or part-time workers to lack insurance coverage.

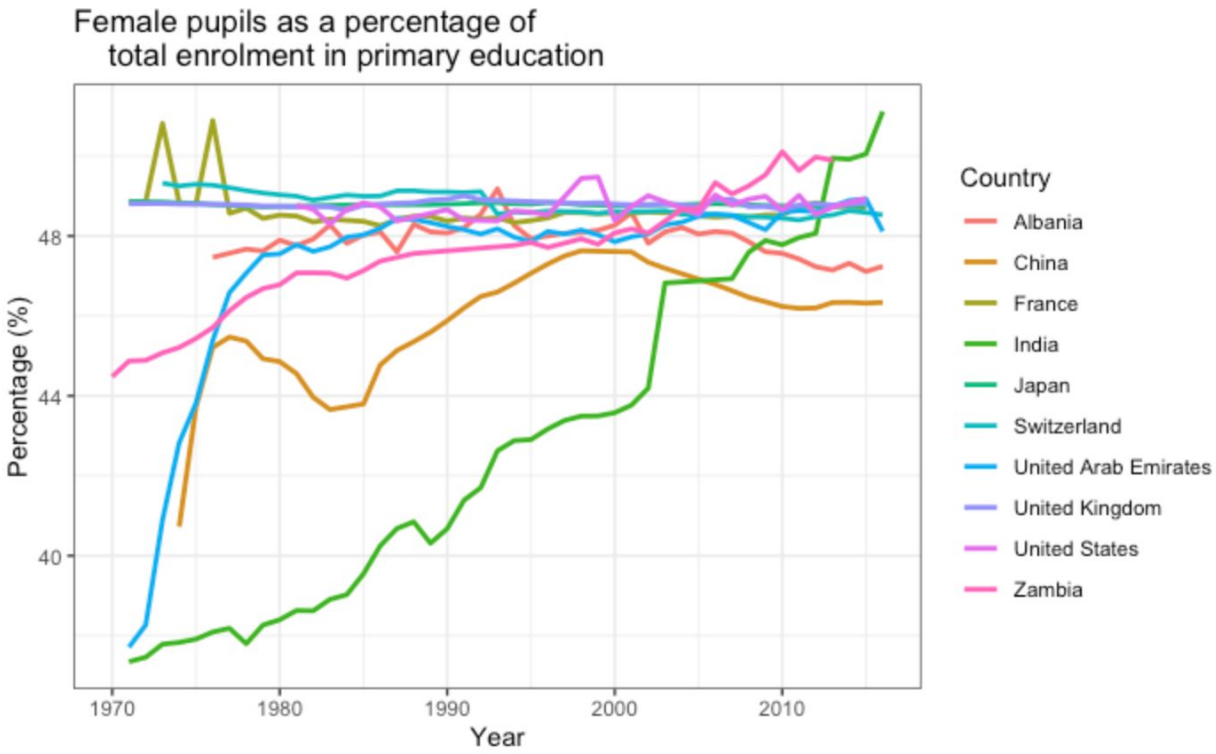
***3.** a) The measure we choose shows the median availability for selected generic medicine (in percentage) by people in the private and public outlets. The availability of essential medicines at public health facilities is often poor. We see that in many countries the private sector provides more access to the essential than the public sector which also means that people with good income are more likely to access essential medicine compared to one with low income. Hence, this somehow helps us to depict the existing health inequality over countries.*

b) Chart providing data for median availability of selected generic medicines in the private sector and public sector (2007–2013):



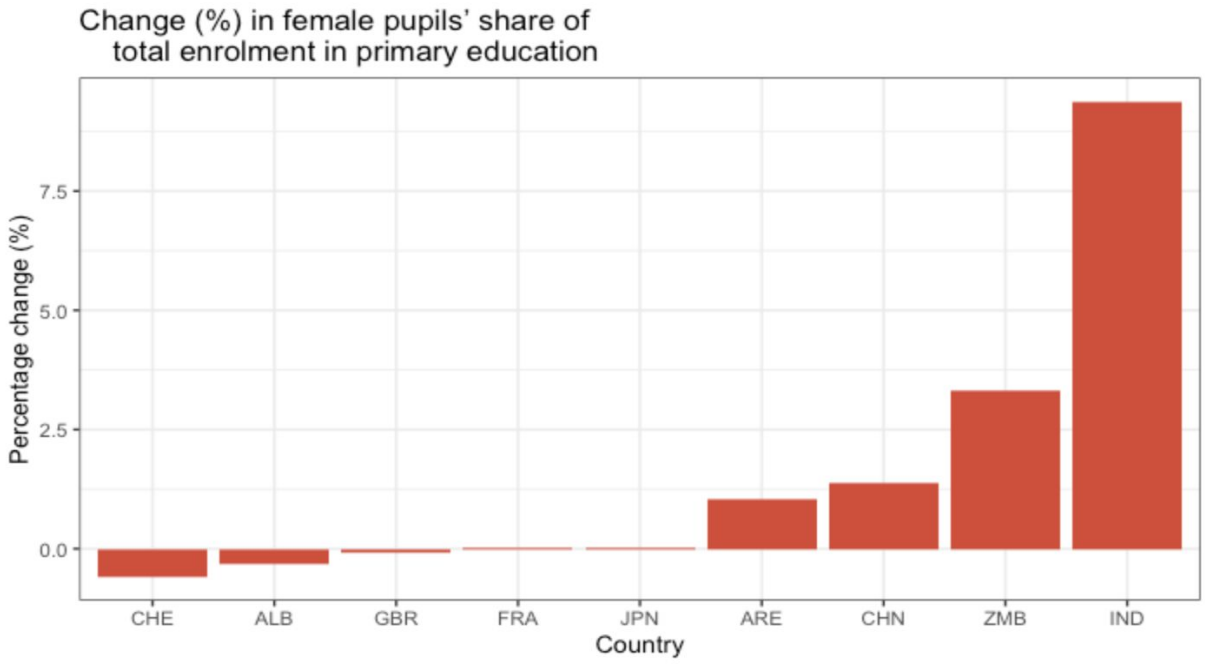
c) The above chart presents the large disparities in health inequality across countries. For example, availability in the Russian Federation is 100%, whereas in China it is about 15%. The availability of medicines within a country can differ depending on whether an outlet belongs to the public or the private sector. In some countries, such as Brazil, private sector availability of medicines is far higher than that in the public sector. The reverse is true for other countries such as Sao Tome and Principe. This disparity means that richer individuals can access a wider range of medical treatments. This data however does not give the complete pictures about upto what point individuals are getting health facilities from the public sectors.The data reflects availability on the day of data collection, which may not be a representative day. Outlets could stockpile medicines in expectation of the arrival of the data collection team. Availability does not account for the dosage and strengths of the products.

***4.** a) Line chart describing gender inequalities in primary education obtain from ten chosen countries for the data from 1980 to 2010 is following:*



b) The percentage of female pupils enrolled in primary education has increased for most of the selected countries. However, it seemed to have a slight decrease in some countries over the years. In countries such as India, it has been improved significantly, by 2010 the female share reached nearly 48%. Whereas, in China first the percentage has risen and then it started to fall which could be due to the increasing gender imbalance in the school-age population, in 2010, male to female ratio for people aged 0-24 years for China was 112 males per 100 females.

c) Change (%) in female pupils' share of total enrolment in primary education (1980–2010):



d) India had the largest change, whereas France had the smallest change.

e) India was among the countries with the least percentage of female pupils enrolled in education in 1980. Rapid development and changing beliefs have contributed to the efforts to reduce gender education inequalities. The developed countries have already a high number of female participation in education and had almost no changes over the years. Universal primary education and promotion of gender equality are among the eight goals in the Millennium Development Goals (MDGs) to which India committed to achieve by 2015 since 2000.Countries that had the smallest changes had relatively high equality from the beginning of the period and hence had experienced relatively little change over the period.The data demonstrates that the past few decades have seen a significant improvement in access to education for girls.

f) The number of male and female students enrolled in school can be affected by the gender composition of the population. If there are more male than female children of primary schooling age in a country, then the share of females enrolled must be less than 50%.The ratio of female to male in enrolment rate, which provides a population-adjusted measure of gender parity, can be used instead.