

»» Measuring inequality – Important statistics for describing income distribution

No 21, 2 November 2017



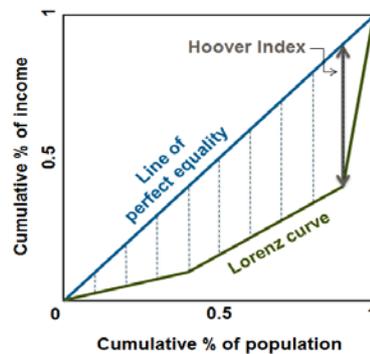
Author: Jonas Petrenz
Editor: Karla Henning

For a very long time, international development policy has focused on the issue of combating extreme poverty. It is only in the past few years that the issue of income inequality has increasingly come to the fore. Meanwhile, reducing inequality has even become anchored as a universal objective in the 2030 Agenda for Sustainable Development (SDG 10).

There is less international consensus about the best way to measure inequality. Analogous to poverty measurement, most measures of inequality concern the monetary dimension (income and wealth distribution). The most important measurements of inequality for income distribution, including their respective benefits and drawbacks, will be briefly presented in the following:

a) The **Gini Index** is the most widespread measurement of income inequality in the field of economics due to its easy interpretability, among other things. It is based on the Lorenz curve: to do this, all income earners are first sorted on the x-axis according to individual income amounts in ascending order; on the y-axis is the percentage of all people with individual incomes lower than or equal to those incomes of the aggregated total income (Graphic 1). If income equality is perfect, the Lorenz curve is a line at a 45° angle (blue line). The Gini Index now describes the relationship of the (shaded) area between the Lorenz curve and the line at the 45° angle to the whole triangle area underneath the 45° line. If there is completely equal distribution, the Gini Index has a value of 0; if distribution is completely unequal (one person owns everything) the value is 1. The Gini Index takes the overall distribution into account but reacts more sensitively to changes in the middle range of distribution, while

Graph 1: The Lorenz curve



developments at both extremes tend to be poorly registered.

b) Building on the Gini Index, the **Theil Index** introduces weighting of individuals/groups based on their income. It is thus more sensitive to changes in the upper distribution range (highest percentages of income). Because the Theil Index is not capped, it cannot be easily interpreted as an absolute value and thus tends to be more suitable for evaluating changes over time.

c) The **Atkinson Index** is subject to the assumption of diminishing marginal utility. That means that the benefit of an additional unit of income is higher for those who have a lower income. The Atkinson Index measures the welfare loss of a society by calculating "lost utility" that arises from unequal distribution of income (in comparison with benefit-optimised distribution). The Atkinson Index is relatively complex to calculate. It is sensitive to changes in the lower range of distribution.

d) **Relational measurements** place certain income groups in relation to each other. For example, the **Palma Ratio** is the ratio of the richest 10% of the population's share of income divided by the share of the poorest 40%. Because this

measurement primarily reacts to changes at both extreme ends of the distribution range, it is used increasingly often in the "poor and rich" inequality debate. However, statements concerning the middle range of distribution cannot be described well by this type of ratio.

e) The **Hoover Index**, also known as the Robin Hood Index, indicates the portion of the unevenly distributed income that would have to be redistributed in order to create completely equal distribution. It can be deduced graphically from the maximum vertical distance between the Lorenz curve and the 45° line of perfectly equal distribution (see Graphic 1). Corresponding to the Gini Index, the value 0 represents perfectly equal distribution and 1 represents absolute income inequality. It is both easy to calculate and to understand.

Conclusion: Many measurements of inequality with different strengths/weaknesses

The income distribution curve contains a great amount of information that can only be reduced to an individual statistic with significant loss of information. This is why there are a number of alternative measurements of distribution. Each measures a different aspect or focuses on different parts of the distribution curve. But no one can say that one measurement is better than another measurement per se. Rather, the selection should depend on the question to be examined and what sections of distribution are therefore of particular interest. However, one should also consider the fact that information about income distribution is often based on rough estimates and often-used distribution measurements thus do not necessarily yield more reliable results. ■