

Gini Coefficient Explained: How to Calculate the Gini Ratio

 masterclass.com/articles/gini-coefficient

Learn from the best.

What Is the Gini Coefficient?

The Gini coefficient, also referred to as the Gini index or Gini ratio, is a rough statistical measure of income inequality or wealth inequality. Gini coefficient can be applied on the micro-level (such as in a town or city) or the macro-level (for example, globally).

Economists use the metric to quantify either income distribution or wealth distribution, though they often use it as an indication of income distribution.

The Gini coefficient ranges along a spectrum from zero to one. Zero (or zero percent) represents a system of perfect equality in which household income is the same population-wide. On the other hand, one (or one hundred percent) represents a system of perfect inequality in which one individual collects all of the total income. A higher Gini coefficient indicates a society that deviates more from a system of perfect income equality.

According to World Bank estimates, South Africa, Namibia, and Suriname currently have some of the highest Gini coefficients worldwide. In contrast, Slovenia, the Czech Republic, and the Slovak Republic have some of the lowest.

A Brief History of the Gini Coefficient

Since its invention over a century ago, the Gini coefficient has been an important metric for income inequality:

- **1. The precursor:** In 1905, American economist Max Lorenz devised the Lorenz curve, a visualization of inequality that plotted wealth or income along the y-axis and population percentage along the x-axis.
- **2. Invention:** In 1912, Italian statistician Corrado Gini built upon Lorenz's creation by calculating the difference between a graph with a line whose slope is one (representing a perfectly equal distribution of income) and a graph illustrating the distribution of income in a given country. The difference between these graphs is essentially the Gini coefficient.

- **3. Applying the Gini coefficient:** Economic historians have used the Gini coefficient as a metric of inequality since its inception. The consensus surrounding the progress of the global Gini coefficient indicates that inequality increased during the nineteenth and twentieth centuries before declining in the twenty-first century due to economic growth in developing countries—particularly in parts of Latin America, Asia, and Eastern Europe. (However, countries like Brazil and Serbia have high Gini coefficients for their respective regions.)
- **4. Beyond the Gini coefficient:** In more recent years, as the world’s attention has focused on how the world’s top earners have increased their share of global wealth, economists have begun to turn to new metrics to compute inequality. One particularly prominent measure is the Palma ratio, which quantifies the severity of the gap between high-income individuals in the ninetieth percentile and low-income individuals in the fortieth percentile of a given country.

How to Calculate the Gini Coefficient

You can calculate the Gini coefficient for a given country by following these steps:

1. **Collect and plot per-capita income data.** Plot population percentiles along the x-axis of a graph and percent of overall pretax national income on the y-axis. (The more complete this data set is, the more accurate the curve will be.) This is your Lorenz curve.
2. **Add a line with a slope of one.** This line represents perfect equality, in which income is distributed evenly across the entire population.
3. **Find the area differential.** Calculate the area under the line representing perfect equality (this is 0.5, the area of a triangle with a base of 1 and a height of 1). Next, calculate the area under the actual Lorenz curve. (You can do this with a graphing calculator or by dividing the area into multiple rectangles and triangles.) Then subtract the area underneath the Lorenz curve from 0.5. This will give you the area between the “perfect equality” Lorenz curve and the actual Lorenz curve.
4. **Divide by the area under the perfect equality curve.** To find the final value of the Gini coefficient, divide the area differential by the total area under the perfect equality curve (0.5).

4 Limitations of the Gini Coefficient

The Gini coefficient is useful as a rough illustration of wealth or income distribution. To achieve a truly cumulative picture, consider it as one facet rather than a definitive description.

1. **Overall income vs. comparative income:** The Gini coefficient only tells you the relative income levels within a given country and is therefore GDP-agnostic. In other words, a higher-income country and a country with a much lower income overall could have the same Gini coefficient so long as their income distributions are the same.

2. **2. A big-picture measurement:** The Gini coefficient doesn't tell you anything about demographic differences in income level or economic conditions on the ground. For example, Thailand and Spain have similar Gini coefficients but completely different economies.
3. **3. Measurement limitations:** Since the Gini coefficient is measured using inputs like tax and survey data, it can only capture income that citizens report. As a result, it misses two key phenomena. First, poorer countries and low-income populations are more likely to engage in the informal or shadow economy, so income data for people toward the lower quintile is more likely to be incorrect. Second, high-income individuals can use loopholes and tax havens to hide their true income, creating distortions on the opposite end of the scale.
4. **4. Similar but different Lorenz curves:** Since the Gini coefficient is a function of the difference in area between two curves, it doesn't capture details about different income distributions between countries with similar coefficients. Even if two countries have the same median income, the specific dispersion of income within their Lorenz curves could very well be different. So even if their deviations from perfect equality are the same numerically, they may look quite different graphically. Their similar Gini coefficients wouldn't reflect this.

The Significance of the Gini Coefficient

Major intergovernmental bodies, like the World Bank, the Organisation for Economic Co-operation and Development (OECD), and the United Nations, still use the Gini coefficient in world rankings data to illustrate the current state of income inequality worldwide.

However, keep in mind that the Gini coefficient, while still in use, remains one part of any holistic view of worldwide economic inequality.