

PROFESSOR HANS ROSLING, Gapminder Foundation

Economics, it can be tricky to understand, but I'm going to show you an easy way I use to compare economic levels of countries. I'm going to use my favourite economic indicator, GDP per capita. It's sort of an income per person expressed in dollars, but I'm also going to show you why you have to be careful with the type of scale you use when you display income data.

But first, take a look at this. I'm using income per person to tell the story of every country in the world over the last 200 years. Ladies and gentlemen, I'm going to give you my all-time favourite graph, I'm going to show you the history of 200 countries during 200 years in less than one minute. I have an axis for income, I have an axis for life span, I start in 1800, and there are all the countries. And back in 1800, everyone was down in the poor and sick corner, can you see, low life span, little money, and here comes the effect of the industrial revolution.

Of course, the countries in west Europe, they are coming to better wealth, but they're not getting much healthier in the beginning. And also on the colonial domination doesn't benefit anything in there, they remain there in the sick and poor corner. And now health is improving, health is slowly improving here, it's getting up here and we are coming into the new century, and the terrible First World War, and then the economic recession after that, and then the Second World War. And now independence, and with independence health is improving faster than it ever did in other countries here, and now starts the fast economic catch up of China and other Latin American countries. They come on here, and India is following there, and the African countries is also following.

It's an amazing change that has happened in the world. You can find data on income in the form of GDP per capita on this webpage of the World Bank. GDP per capita is presented in many different forms. I prefer GDP per capita in purchasing power parity dollars. All values are given in dollars, but they are adjusted for inflation and for the cost of living in each country. This allows you to make comparisons across countries and across years. In the film clip you just saw, I presented income per day, but normally we show income per year.

How best to plot the economic level of countries, that is which scale is best to use? The most common plot scale called linear scale; it's the same distance between each mark, 10,000, 20,000, 30,000, 40,000. The richest countries, they have around \$40,000 per person a year. But the poorest countries are almost at zero, they only have about \$400 per person, and most countries would fall in this lower range. That's why I like to use what I called a rubber scale. Officially it is called logarithmic scale. This is the abbreviation used. Rubber scale I call because I can expand the low incomes. I let this middle one be \$4,000. Up here it's still 40,000, and down here it's 400. So you see on the linear scale the same distance add the same amount, whereas on the logarithmic scale the same distance multiply with the same amount, times ten and times ten again.

This is the data in the film clip you just saw. On the log scale you can really see the difference between the middle income countries and the poorest countries, how far they've come from Congo to Ethiopia, India, China, and the Latin American countries. When some people see this they say it's misleading with log scale, makes the poor countries look closer to the rich countries than they really are. Here is the same data on linear scale, and it looks very different. You can now see the differences between the rich countries much better, but it misses something else. The middle income countries and the poorest countries are crammed together so you can't see the important differences in this group. Even this big red bubble, China, looks quite poor.

It's not that logarithmic or linear scale is right or wrong. They show different things, so you have to choose carefully which one to use, but I think log scale really is the best to show the differences in the world.