Economics Assignment: Lorenz Curve

Assignment Overview

The *Lorenz Curve* is a graphical representation to measure wealth inequality developed by Max Lorenz. By definition, the Lorenz curve measures the proportion of wealth held by the bottom proportion of the population. For example, let Lorenz curve be defined by function $L(x)$. $L(.1) = 0.07$ means the bottom 10% of the population in a country owns 7% of the overall wealth in that country.

> **Exercise 1:** Justify why $L(0) = 0$ and $L(1) = 1$. Explain using the definition of Lorenz curve.
> **Exercise 2:** What would be the domain and range of the function $L(x)$?

In a world with perfect equality, we should expect $L(x) = x$. However, in reality, we would find Lorenz curve to be below that. The difference between $y = x$ and $y = L(x)$ is the equality gap.

> **Exercise 3:** Draw a sketch of the equality gap. Clearly label the axes and include the both $y = x$ and $y = L(x)$ in the same coordinate plane. You can assume $L(x)$ is a smooth curve for now.

In economics, the *Gini coefficient* is calculated as the ratio of the equality gap over the ideal curve $y = x$ in the domain of Lorenz curve.

> **Exercise 4:** In an ideal world with perfect equality, what would the Gini coefficient be equal to?
> **Exercise 5:** Based on your answers in previous parts, write out the formula to calculate the Gini coefficient G.

In practice, the Lorenz curve is usually calculated by using the quintiles (i.e. every 20%) of the population.

In 2018[1], the U.S. has the following income distribution:

Bottom % population	20	40	60	80
% income held	5.2	15.5	30.8	53.2

Exercise 6: Find the Gini coefficient for the U.S.

Exercise 7: The *Gini index* is just the Gini coefficient in percentage form. Slovenia is among the countries with the lowest income inequality. Use the following table to find the Gini index for Slovenia in 2018.

Bottom % population	20	40	60	80
% income held	10.1	24.7	42.8	65.1

[1]Data from: https://knoema.com/crmndag/gini-coefficient-and-lorenz-curve-around-the-world?country=Slovenia&Time=2018-2018