

**ECON 3003 Advanced Public Economics**  
**Fall 2022 – Prof. Dario Tortarolo**

**Tutorial 1**

**1. Income Inequality**

Take a look at the World Inequality Database (WID) at <https://wid.world/>. Choose a country of your preference and construct the following figures for the period 2000-2021:

- (a) Plot the top 1% income share and the bottom 50% income share *before* taxes (i.e., based on pre-tax national income). Has inequality increased or decreased during these years?
- (b) Add to the previous figure the top 1% and the bottom 50% income shares *after* taxes (i.e., based on post-tax national income). Overall, is the tax system redistributive?
- (c) Empirical evidence has shown systematic biases in individuals' evaluations of their own relative position in the income distribution. This plays a vital role in political economy and public finance models.<sup>1</sup> First, try to guess what percent of the UK population do you think earns more income than you. Second, find out where you actually lie in the UK income distribution by taking a test at <https://wid.world/income-comparator/GB/>.

**2. Lorenz Curve and Gini Coefficient in the UK**

The HMRC posts online tabulations of the distribution of annual individual incomes based on Individual Income Tax data. We will focus on statistics for tax years 2019/2020 and 2021/2022 available online in Table 2.5 posted at ([link here](#)).

- (a) Using Excel, draw the empirical Lorenz curve for the Total Income distribution for the two tax years 2019/2020 and 2021/2022 (assume the Lorenz curve is linear in between each point you can draw). For this, use columns J and K of the Excel Table 2.5.
- (b) Compute the Gini coefficient for 19/20 and 21/22 from the Lorenz curves. [Please enter the Gini in this form]<sup>2</sup> Has inequality increased or decreased after the start of the pandemic?
- (c) Table 2.5 also provides in column L the income tax paid by bracket. For each bracket of the tax year 2021/2022, calculate the after-tax income, plot the Lorenz curves for pre-tax and post-tax income, and calculate the after-tax Gini coefficient.<sup>3</sup> Does the income tax help to reduce inequality?

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<sup>1</sup>Cruces et al (2013) find that people who overestimate their relative position (think are richer than they are) tend to demand more redistribution when informed of their true ranking.

<sup>2</sup>You can calculate the area under the Lorenz curve using the formula of a trapezoid,  $h \times [(a + b)/2]$ , with height  $h$  and bases  $a$  and  $b$ ; then add all these areas, subtract from 0.5 and divide by 0.5.

<sup>3</sup>Note that this step implicitly assumes that the ranking of individual tax filers is preserved when using pre-tax and post-tax income.

### 3. Budget Constraint and the Income Tax Trap

In lecture we saw that the UK income tax schedule features a “tax trap” when individuals hit £100k in income. This is because since 2010–11, the Personal Allowance is reduced by 50p for every £1 earned over £100k. Draw the budget constraint for people earning a gross annual income between £80k and £140k, placing pre-tax income on the horizontal axis and post-tax income on the vertical axis. Briefly explain how this “trap” affects the incentives to work for somebody earning £102k.