The impact of redistribution on economic inequality and social mobility

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Goals

Extreme wealth inequality is a social problem. But if governments intervene to tackle inequality, might this have an unintended side-effect of reducing social mobility, by hindering individuals from significantly improving their wealth? This report analyses the relationship between inequality and social mobility, as it is affected by taxation and redistribution.

Methodology

This report is based on a simple discrete-time economic model involving random economic exchanges between individuals[1]. Previous work shows that this model results in economic inequality. I have modified the model to include a tax on every exchange; at the end of each timestep the total tax revenue for that timestep is shared evenly among the entire population[2]. By running this model at different tax rates, we expect to see different levels of inequality (as measured by Gini coefficient): the greater the redistribution, the less the inequality. We will also measure the effect on social mobility (as measured by number of timesteps to achieve 24% mobility, where mobility is defined to be the fraction of the population whose wealth has moved by more than one quintile; 24% mobility is half the value for a perfectly mobile economy).

The simulation was run on a population of size 50,000. At each tax rate, 20 simulations were run, so that the variability of the output could be measured. Each simulation was first run for 5000 timesteps; this 'burn-in' time was chosen to be large enough that the metric 'fraction of total wealth owned by the wealthiest 1%' had stabilized, at both the lowest and the highest tax rates.

Results

The plot below shows the mean and standard error of the two metrics (Gini coefficient, and time to achieve 24% mobility), at each of the simulated tax rates. Standard errors are shown in red. Closer inspection of mobility at tax rates 1% and 5% shows that the error bars overlap.
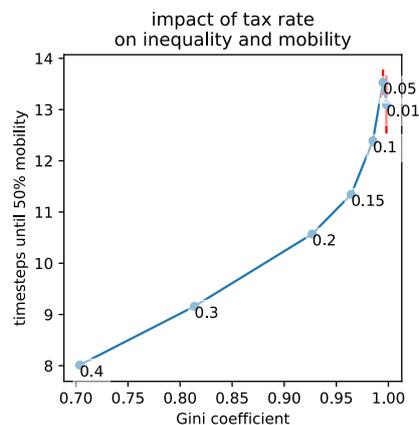
Conclusion

As expected, the greater the redistribution the lower the inequality. It's interesting to see that (in this model) there is no trade-off: redistribution not only lowers inequality, it also increases mobility. Over the range of tax rates studied, the change in social mobility is relatively small: mobility is roughly twice as high at 40% tax as at 1%. Inequality is much more dramatically affected: a Gini coefficient of close to 1 is very extreme inequality, as confirmed by a histogram of wealth distribution, and a coefficient of .7 is substantially less extreme.

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[1] The "Value Transfer Model" described in Tick 1 of IA Scientific Computing, 2022-23

[2] Source code will be made available on the course website, after the tick deadline