

Inequality and Poverty: Analysis and Policy

Fifth lecture: How to define inequality and how to measure it

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Course web page: <http://rszarf.ips.uw.edu.pl/inequality/>

Lecture contents

1. Three types of equality and inequality
2. Inequality of what and between whom
3. Multidimensional inequality
4. Social mobility and its measures
5. Measuring inequality: inequality measures and general procedure for measurement
6. Summary

Multidimensional inequality in what is important in life

Three types of equality and inequality

EQUALITY

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graph TD; A[EQUALITY] --- B[EQUALITY OF TREATMENT]; A --- C[EQUALITY OF OPPORTUNITY]; A --- D[EQUALITY OF OUTCOMES]
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EQUALITY OF TREATMENT

If a person is treated better/worse in comparison to another similar person, it may be a case of inequality of treatment, this is **DISCRIMINATION**

EQUALITY OF OPPORTUNITY

If a person has good conditions for development in childhood and another person does not have such conditions or grows up in conditions that are detrimental to development, this is **INEQUALITY OF OPPORTUNITY**

EQUALITY OF OUTCOMES

If a given benefit (e.g. money, property) or burden (e.g. taxes, fees) is shared unequally, there is an **INEQUALITY OF OUTCOMES**

Comment: **equality of treatment and equality of opportunity are widely accepted as cornerstones of liberal democracy.** Example of Leszek Balcerowicz's statement (architect of economic policy, which transformed state socialism to regulated capitalism in Poland): "The modern ideal, in which I firmly believe, is equality of opportunity, i.e. **a situation in which a person's path in life is determined by his or her personal qualities - mind, talent, perseverance, character - rather than by origin and external conditions.**"

Source of typology: Zofia Morecka, *Spoleczne aspekty podzialu*, 1981, s. 25-27.

First step to understanding of inequality specificity: inequality of what and inequality between who

Two basic questions

1. **Inequality of what?**
2. **Inequality between whom?**

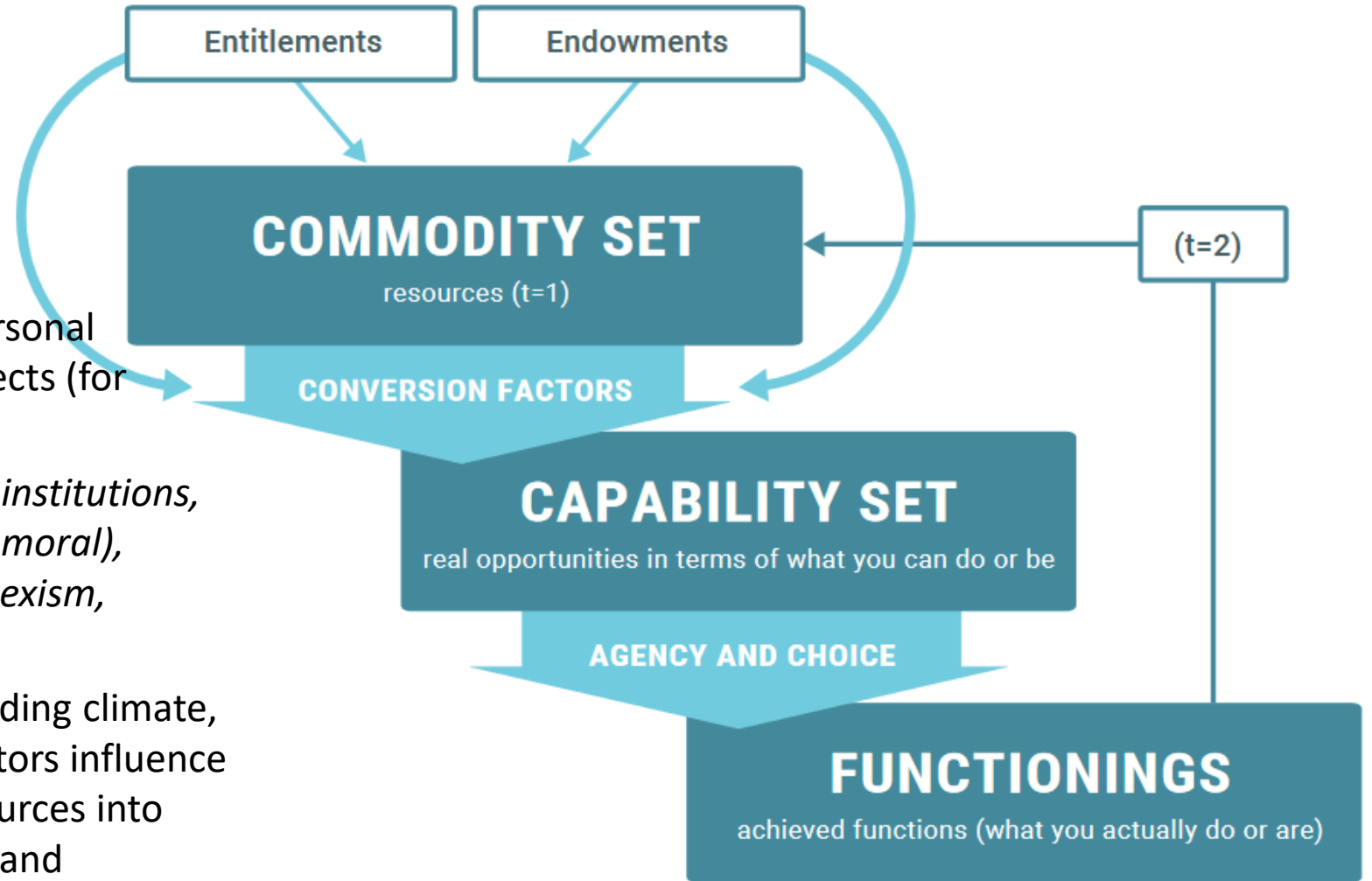
Answer to the question of what: inequality of what is important in human life

1. **LIFE ACHIEVEMENTS (outcomes)** – what we consider as important and valuable achievement in life (being whom, having what, doing what is important?)
2. **LIFE CHANCES (opportunity)** – what we consider as important to have a chance for valuable life achievements

Answer to the question of who: inequality between humans

1. **INDIVIDUALS**
2. **GROUPS** e.g. families, ethnic groups (special case: multidimensional inequalities between ethnic or national groups within one society understood as horizontal inequality as important factor in explanation of social conflict, Frances Stewart)
3. **COLLECTIVITIES** e.g. cities, municipalities, countries, multi-countries regions

Outcomes and opportunities in capability approach (Amartya Sen)



What are conversion factors?

- a) **personal conversion factors** (such as personal characteristics: physical and mental aspects (for example, disabilities), age and gender);
- b) **social conversion factors** (such as social institutions, social norms (gender, religious, cultural, moral), traditions and the behaviour of others (sexism, homophobia, racism, etc.), and;
- c) **environmental conversion factors** (including climate, pollution, deforestation, etc.). These factors influence the conversion rate from individual resources into functionings (outcome or achievement) and capabilities (real opportunities or positive freedoms)

Multidimensional inequality framework

WHAT IS IMPORTANT IN LIFE?



Table 1: Domains of the Multidimensional Inequality Framework

Domain	Short title	Sub-title
Domain 1	Life and health	Inequality in the capability to be alive and to live a healthy life
Domain 2	Physical and legal security	Inequality in the capability to live in physical safety and legal security
Domain 3	Education and learning	Inequality in the capability to be knowledgeable, to understand and reason, and to have the skills to participate in society
Domain 4	Financial security and dignified work	Inequality in the capability to achieve financial independence and security, enjoy dignified and fair work, and recognition of unpaid work and care
Domain 5	Comfortable, independent and secure living conditions	Inequality in the capability to enjoy comfortable, independent and secure living conditions
Domain 6	Participation, influence and voice	Inequality in the capability to participate in decision-making, have a voice and influence
Domain 7	Individual, family and social life	Inequality in the capability to enjoy individual, family and social life, to express yourself and to have self-respect

Example of subdomains in life and health domain

- 1.A. Avoid premature mortality through disease, neglect, injury or suicide
- 1.B. Be protected from being killed or murdered
- 1.C. Be protected from natural and non-natural disasters
- 1.D. Achieve the highest possible standard of physical health
- 1.E. Enjoy good mental health
- 1.F. Have good sexual and reproductive health

7 core domains are divided further into **42 subdomains** and **56 areas** with **186 measures**

European Union Multidimensional Inequality Framework

Across the 10 relevant life domains, the EU MIMF data set provides insights on the disparities in life outcomes according 5 approaches **with 346 indicators**

1. between those at the top and those at the bottom (**vertical inequality**),
2. on the gaps between sexes, age groups or urban and rural dwellers (**horizontal inequality**),
3. on the actual levels of **social mobility**,
4. equality of opportunities (**inequality of opportunity**),
5. on the prevalence of **social norms and practices that arbitrarily discriminate** between individuals and groups



Economic, social and political life as dimensions of inequality

ECONOMY: inequality of economic life achievements and/or chances (economic inequality)

- **What:** economic characteristics e.g. capital, wealth, income, labour market status
- **Who:** economic groups e.g. economic classes (capitalists, managers, workers), low-skilled workers and high-skilled workers, employed and unemployed

Comment: we can combine dimension of what with dimension of who from different spheres, e.g. **income inequality between political parties; educational inequality between economic classes; health inequality between left and right voters**

SOCIETY: inequality of social life achievements and/or chances (social inequality)

- **What:** social characteristics e.g. social status, education, health
- **Who:** social groups with strong common identity, common culture e.g. Poles and Germans

POLITICS: inequality of political life achievements and/or chances (political inequality)

- **What:** political characteristics e.g. political power, voting behaviour (e.g. voting vs not voting), rights and obligations in law
- **Who:** political groups e.g. political parties, political collectivities like voters

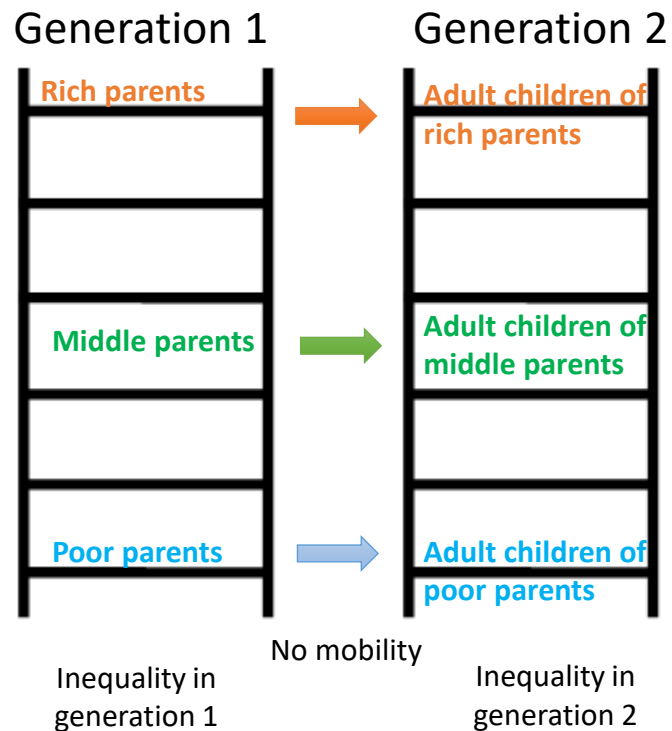
Specific inequality: intersection of what and who to compare

WHAT: what to compare, examples	WHO: who to compare, examples			
	Men to women	Poles to Germans	Youth to the elderly	Paul to Richard
Economic: Income	Inequality in income between men and women	Inequality in income between Poles and Germans		Inequality in income between Paul and Richard
Economic: wealth	Inequality in wealth between men and women		Inequality in wealth between youth and the elderly	
Social: health	Inequality in health between men and women		Inequality in health between youth and the elderly	
Social: education	Inequality in education between men and women	Inequality in education between Poles and Germans		
Political: power	Inequality in power between men and women		Inequality in power between youth and the elderly	
	Multidimensional gender inequality		Multidimensional age inequality	

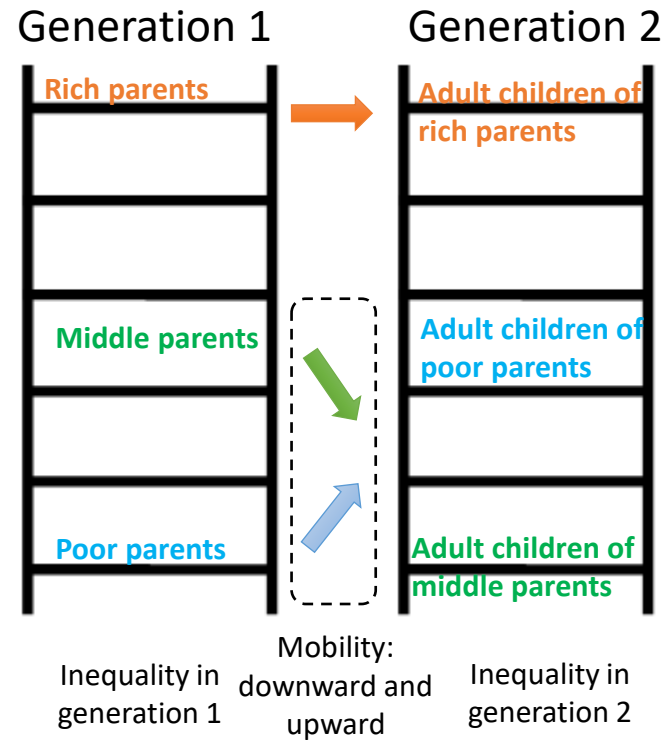
Inequality in one period and mobility in
inequality between two or more periods

Inequality in temporal and generational dimension

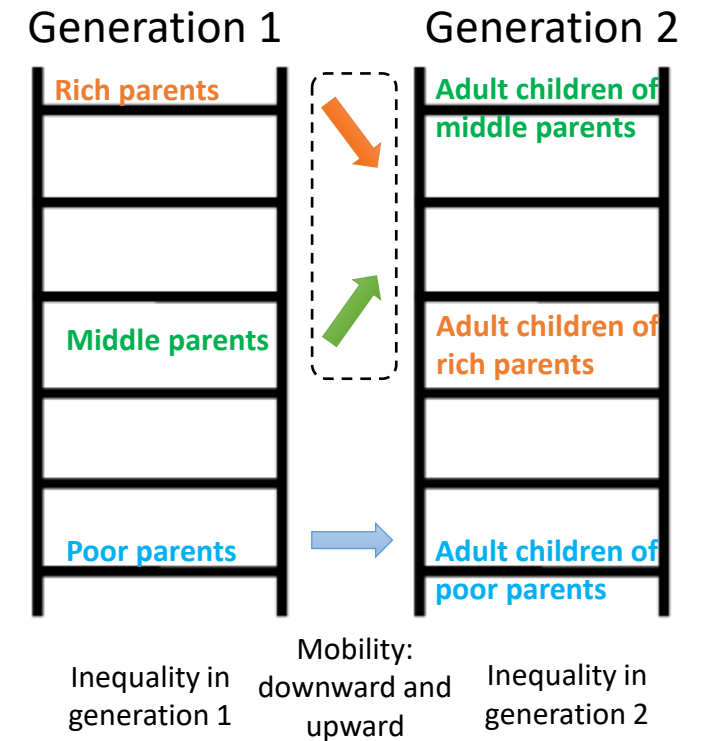
Two generations without mobility: the same position of parents and children



Two generations with mobility in the lower half: exchange of positions in the 2nd generation



Two generations with mobility in the higher part: exchange of positions in the 2nd generation



Measuring inequality is different than measuring mobility e.g. by correlation between position of parents and position of their adult children

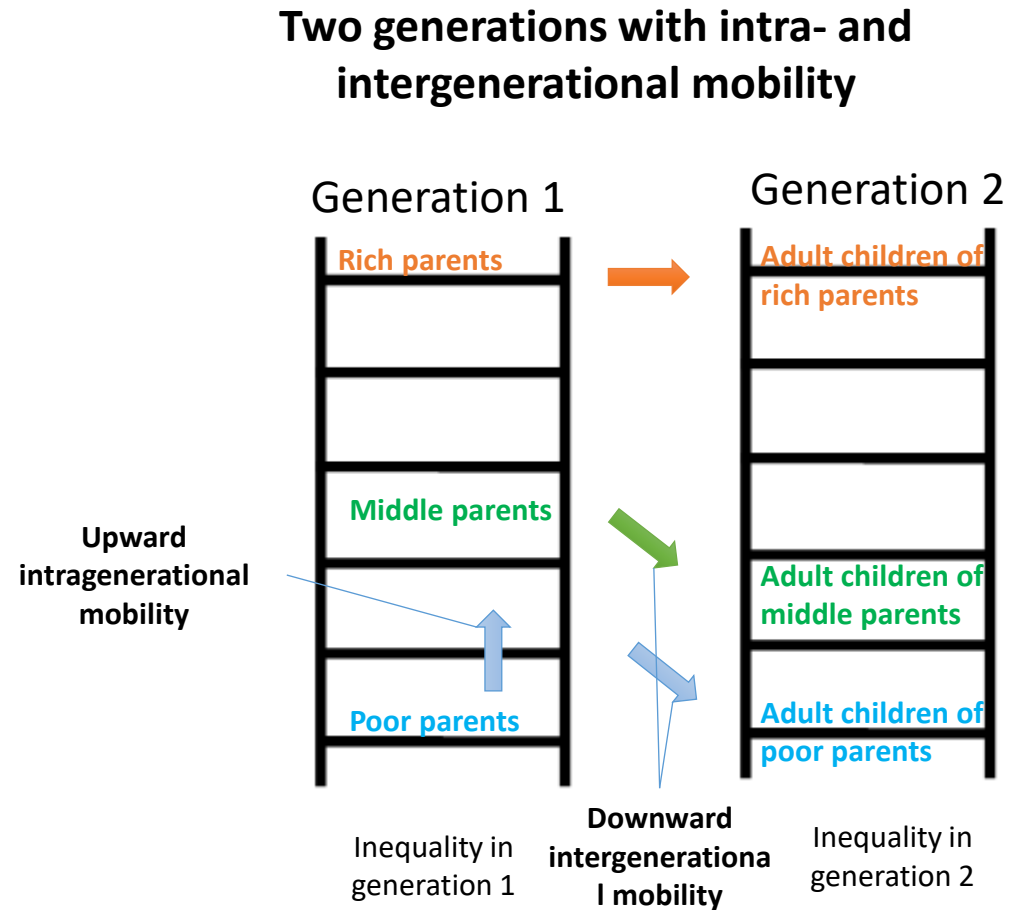
Intragenerational and intergenerational mobility

- **Intragenerational mobility** e.g.

- Poor parents become middle parents when they get older
- Poor children of poor parents as adults become middle children when they get older

- **Intergenerational mobility** e.g.

- Children of poor parents are in the middle as they become adults
- Children of middle parents are in the bottom as they become adults



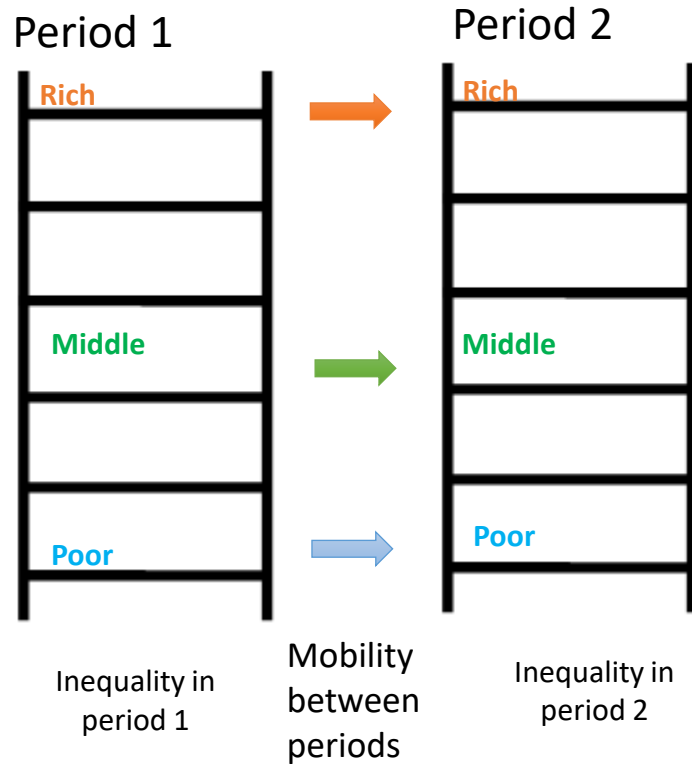
Inequality and mobility: towards generalization

We are observing inequality between the same or related human units in two or more periods

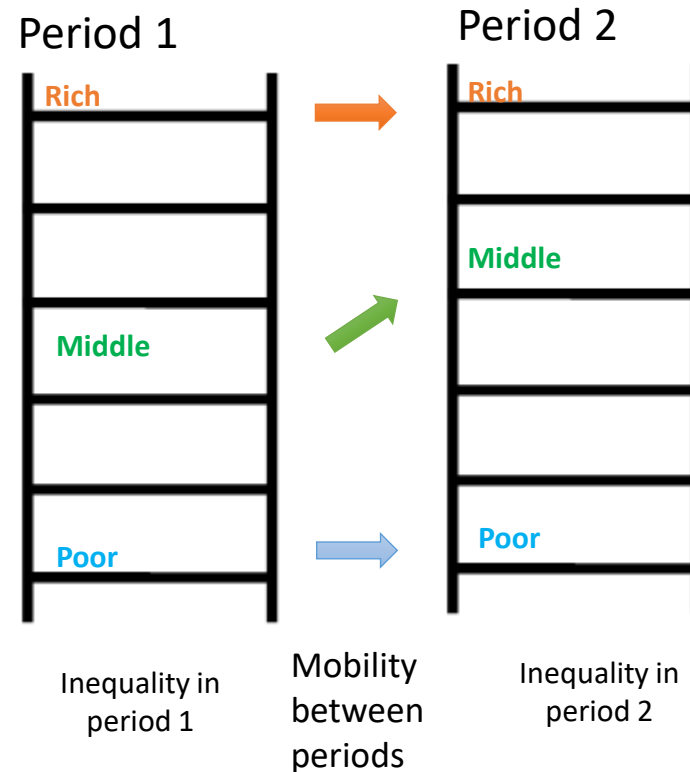
OR

We are observing position in inequality in one period and the position in subsequent periods

NO MOBILITY CASE



MOBILITY CASE



Mobility characteristics

- **General direction:** upward, downward
- **Part of the inequality:** from poor to..., from middle to..., from rich to...
- **Scale :** change by how many rungs, e.g. from poor to less poor vs from rich to poor

Inequality change with mobility type

Inequality in period two to period one	Mobility between two periods	
	Upward dominated	Downward dominated
More	1. Inequality is increasing with upward mobility	2. Inequality is increasing with downward mobility
Less	3. Inequality is decreasing with upward mobility	4. Inequality is decreasing with downward mobility

Upward or downward dominated means majority upward or majority downward

There are many social mobility measures e.g. absolute and relative measures of social mobility

The measure of absolute mobility requires inflation-adjusted income data for parents and their children of the same age. **If the children's real incomes are higher or lower than the parents', we have upward or downward mobility.** We can calculate the shares of mobility in each direction

The measure of relative mobility requires data on the inflation-adjusted income of parents and their children of the same age, but also data on their income class, e.g. low, middle or high. Now, **a higher or lower real income of adult children compared to that of their parents indicates mobility only if they change their income class**

This is a simple numerical example of absolute and relative mobility for 4 individuals. In the cases of B and C we have upward and downward absolute mobility with no change in relative mobility

Individual	Individual's Income	Parent's Income	<u>Absolute</u> <u>Mobility</u>	Individual's Group	Parent's Group	<u>Relative</u> <u>Mobility</u>
A	\$50,000	\$40,000	Upward	Middle	Low	Upward
B	\$60,000	\$55,000	Upward	Middle	Middle	No change
C	\$40,000	\$45,000	Downward	Middle	Middle	No change
D	\$80,000	\$70,000	Upward	High	Middle	Upward

Measuring inequality

Visual Explanation of the Gini Coefficient

The Most popular statistical measure for economic inequality – Gini Coefficient

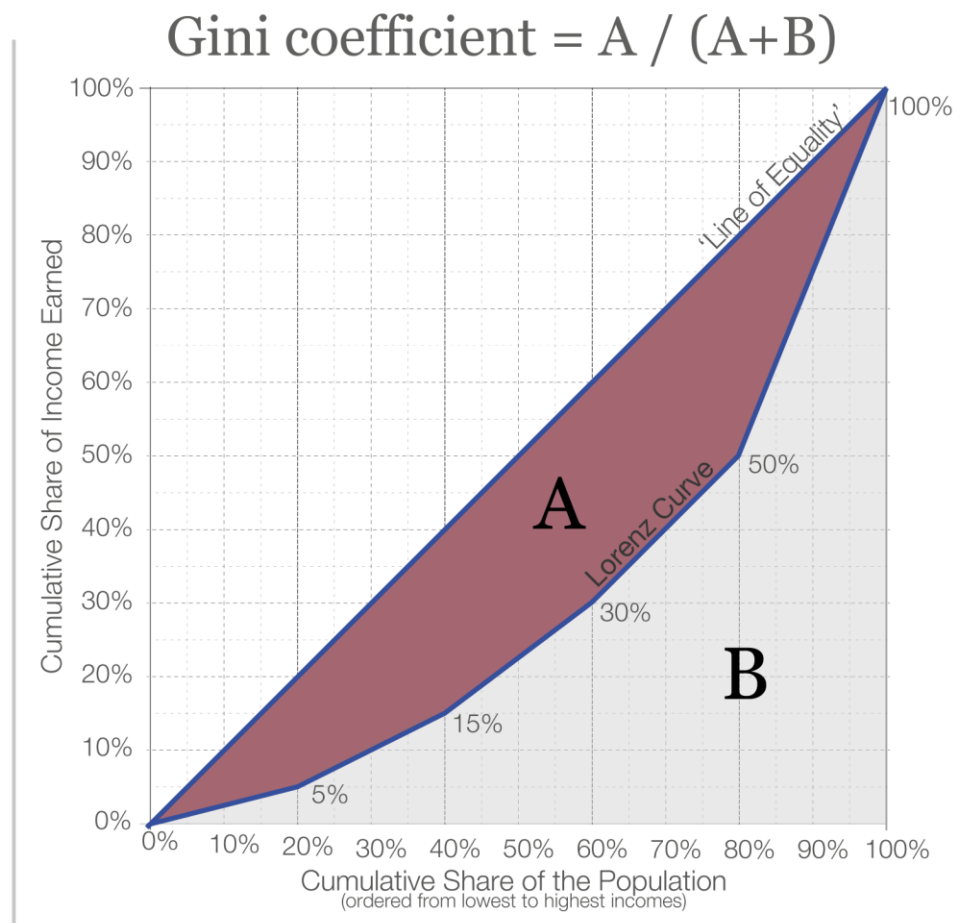
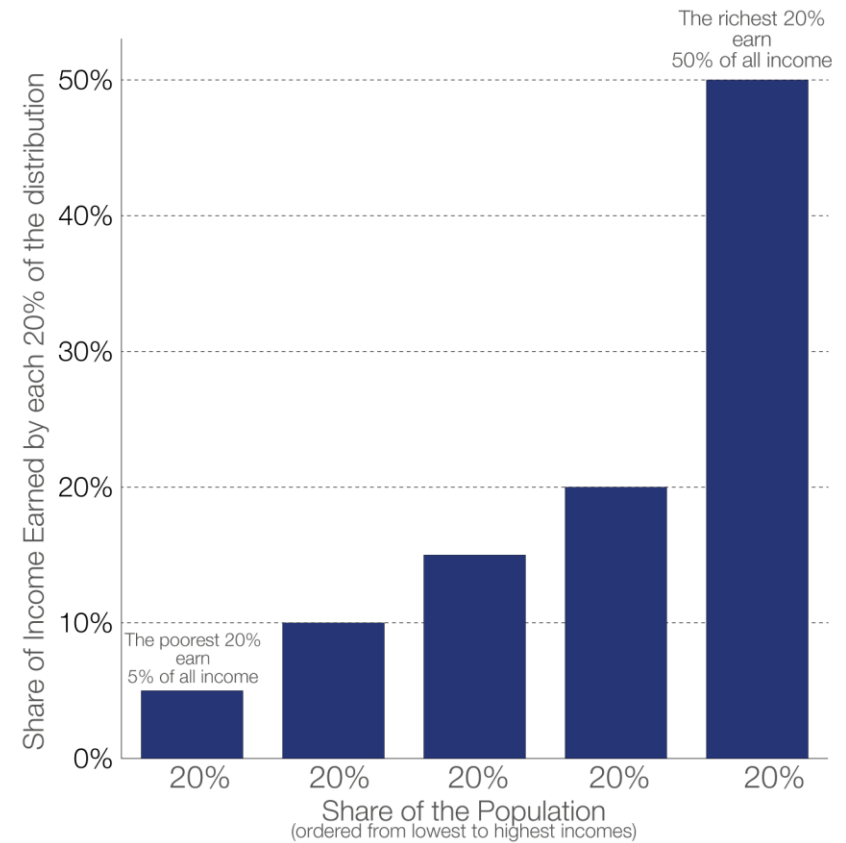
The bar chart on the left shows a simple distribution of incomes. The total population is split up in 5 parts and ordered from the poorest to the richest 20%. The bar chart shows how much income each 20% part of the income distribution earns.

The chart on the right shows the same information in a different way, both axis show the cumulative shares: The poorest 20% of the population earn 5% of the total income, the next 20% earn 10% – so that the poorest 40% of the population earn 15% etc. The curve resulting from this way of displaying the data is called the Lorenz Curve.

If there was no income inequality the resulting Lorenz Curve would be a straight line – the 'Line of Equality'. A larger area (A) between the Lorenz Curve and the Line of Equality means a higher level of inequality.

The ratio of A/(A+B) is therefore a measure of inequality and is referred to as the Gini coefficient, Gini index, or simply the Gini.

[Gini coefficient calculator](#)

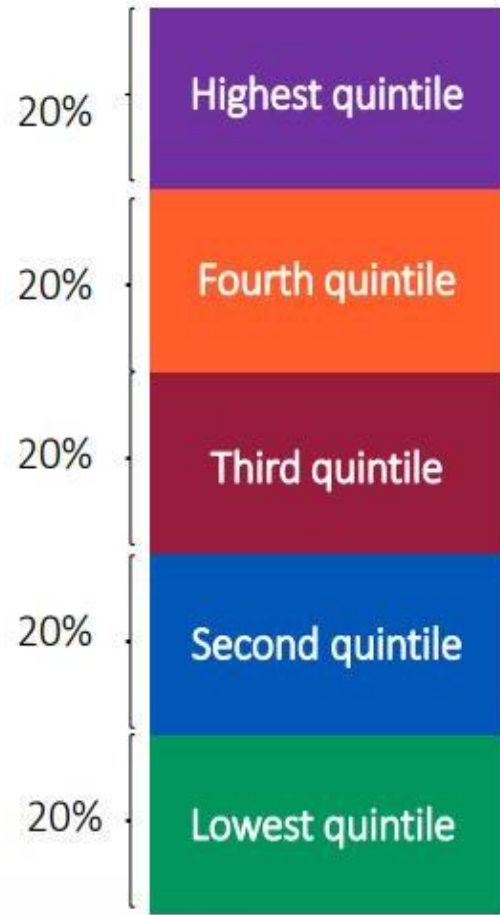


Visualisation of equality and inequality by income shares

Equal income distribution (line of equality)

All Households

Top 20% has a 20% of income

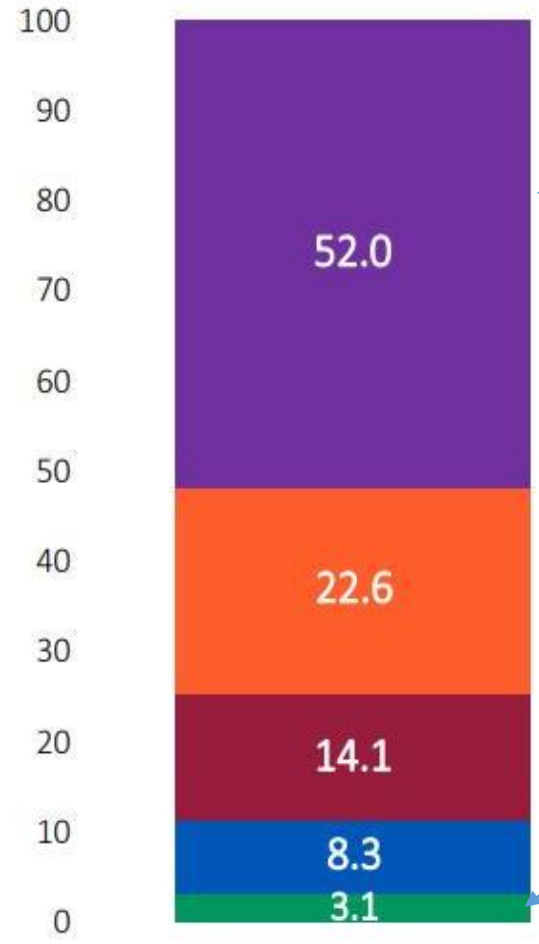


Bottom 20% has a 20% of income

Real income distribution

Percent of aggregate income

Top 20% has a 52% of income



Bottom 20% has a 3.1% of income

<https://twitter.com/JustinWolfers/status/1171426326458167300>

Some issues with Gini Coefficient

- **Absolute increase in differences are not measured**
 - EXAMPLE: A has 100\$, B has 1000\$, if we add 10% to both Gini will not change, but absolute difference will increase from 900\$ to 990\$
- **Different distributions of income could have the same Gini but very different interpretation (see chart)**



Joe Atikian @joe_atikian · 13 godz.

@MilesCorak @utpress Nice approach, well executed.

I offer my "Gini Quartet in A+ Major" as one of several thinking tools.

Gini is the same but inequality is at the bottom (panel A) or at the top (panel B), see differences in top 1% share and bottom 10% share between panel A and B

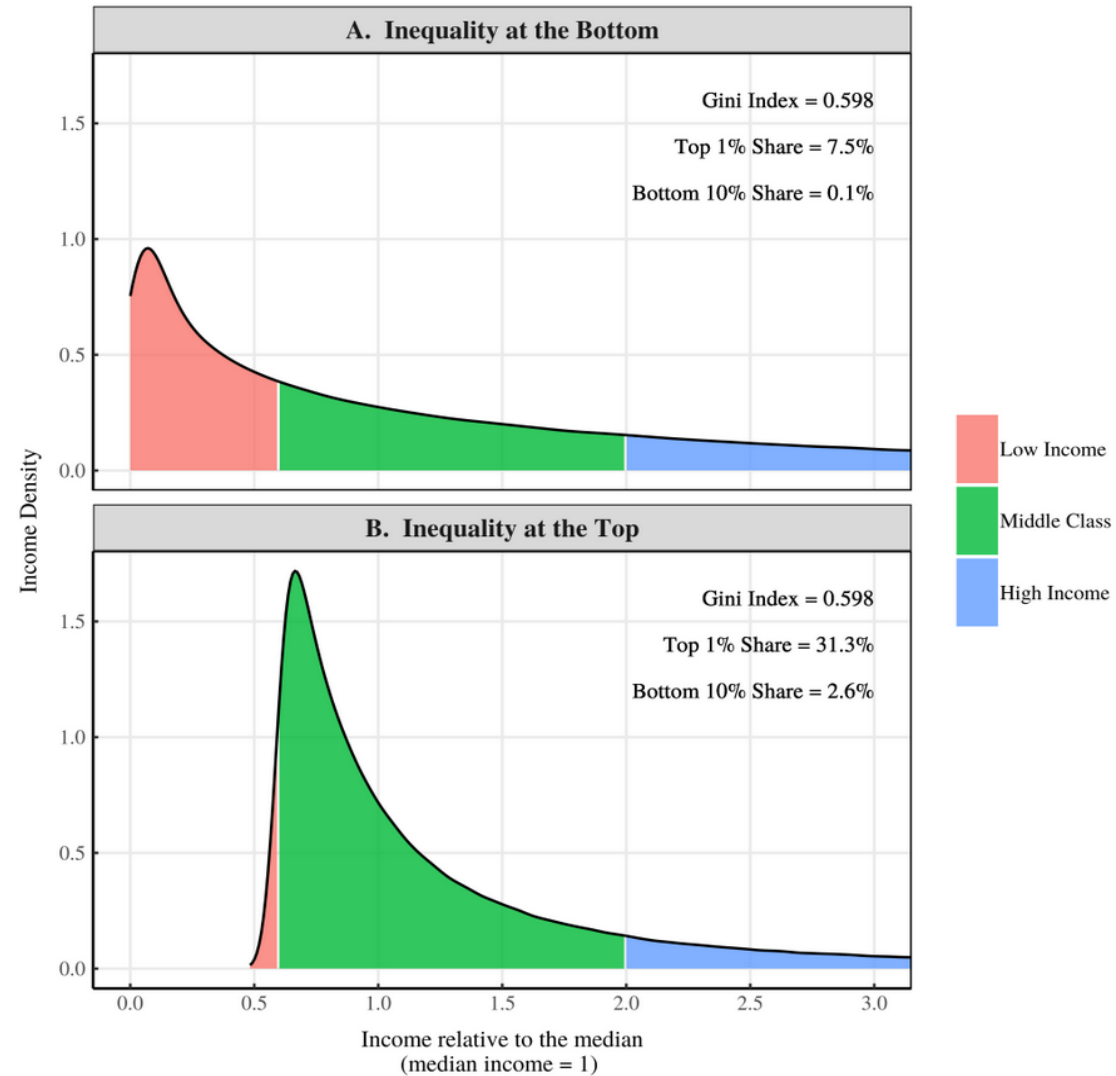


Figure 1: Income density plots for a society with inequality at the bottom and a society with inequality at the top

Inequality measures: pros and cons

Pros

- + The Lorenz curve is a commonly used metric that allows for the quick and visual comparison of inequality across countries.
- + The Gini coefficient uses information from the entire income distribution and is independent of the size of a country's economy and population.
- + Percentile ratios are easy to calculate and focus on a specific region of the distribution.
- + The Theil index can decompose inequality into within- and between-group inequality.
- + These commonly used measures are generally in agreement when comparing inequality across countries.

Cons

- If Lorenz curves cross they cannot provide a conclusive ranking between distributions.
- The Gini coefficient values change depending on what is measured —wages, before-or after-tax income, wealth, or consumption.
- Percentile ratios fail to use all information since they ignore incomes between percentiles.
- The Theil index is less intuitive and not directly comparable across populations with different sizes or group structures.
- The evolution of inequality within a country can appear different depending on the metric used.

General procedure how to measure inequality

1. Inequality of what

1. Choose **sphere of life** for comparisons e.g. economic, political, social
2. Choose **dimension in selected sphere** e.g. income, wealth, power
3. Define dimension e.g. disposable income in monetary units

2. Inequality between who

1. Choose **human unit** (who to compare) e.g. men to women, households to households, generation to generation

3. Measure selected dimension for selected human unit

4. Devise **numerical scale for inequality** in selected dimension e.g. Gini coefficient from 0 (perfect equality) to 1 (maximum inequality), percentile ratio (e.g. 10th to 50th) from 0 to 100%

5. Calculate inequality measure for your case (what and who inequality)

6. **Evaluate results** e.g. low inequality, moderate inequality, high inequality

What we have learnt? Summary

1. There are three types of equality: equality of treatment, equality of opportunities and equality of outcomes
2. Inequality of what and between whom are main questions we should answer to understand multidimensionality and specificity of inequality
3. There are several multidimensional inequality framework with 7 or 10 domains of life and many subdomains and hundreds of specific measures of vertical and horizontal inequality, inequality of opportunity, social mobility and discrimination
4. Social mobility is different than social inequality, and it has its specific measures
5. There are many measures of economic inequality, but Gini Coefficient based on Lorenz Curve are the most popular
6. Different distributions of income could have the same Gini Coefficients
7. Gini Coefficient is a relative measure of inequality i.e. if all incomes increase or decrease by the same percent, then Gini is not changing
8. There are more inequality measures than Gini e.g. percentile ratios, gender gaps, odds ratios etc. with its advantages and drawbacks