Inequality in Health

Tutorial 5

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Inequalities in Outcomes

There are several reasons for **inequalities in outcomes** such as wages or life expectancy between groups of individuals. However, in some cases inequalities **might be justified**. Most people would accept outcomes to differ between individuals if the person with the higher outcome has a **higher effort** and individuals with the same level of effort would have exactly the same outcomes.

Inequality of Opportunity

If outcomes differ due to factors an individual is **not responsible** for (e.g., family background, natural disasters, or gender) although the level of effort is identical, these inequalities might be considered **unacceptable**. Then, **(economic) policy might be necessary** to reach a state where outcomes only depend on the individual effort and not on circumstances.

Formalization

Roemer formalizes this concept by defining the outcome for which the opportunities are to be equalized as a function $\mathbf{u}(\mathbf{C}, \mathbf{e}, \varphi)$ where $\mathbf{C}$ denotes the individual's **circumstances**, $\mathbf{e}$ is the **effort**, and φ is a specific **policy**.

Example 1: Wage Earning Capacity

The first example deals with equalizing the opportunities for high wages such that **wages** only depend on the **years of education** and not on the **socio-economic status of the parents**. A potential policy for reaching this goal is the **per-pupil educational expenditures** of the state which might vary according to the characteristics of the school's neighborhood. Formally, **u** is the individual's wage, **C** is the parents' socio-economic status, **e** is the number of years of education, and φ are the educational expenditures.

Example 2: Life Expectancy

The second example deals with individual **life expectancy**. Life expectancy should not depend on the **parents' socio-economic status** but only on **individual behavior** such as exercising, eating healthily, not smoking, or not drinking. The policy to reach equal opportunities is the allocation of medical care services.
Formally, **u** is the individual's life expectancy, **C** is the parents' socio-economic status, **e** is the life-style quality, and φ is the allocation of medical care services.

Employment and Disability

One example might be the opportunities of disabled individuals in the labor market.
Disabled people usually have worse opportunities in the **labor market** than non-disabled individuals which is considered unacceptable. However, unemployment due to negative attitudes such as **laziness** is generally not considered unfair. A popular policy is **inclusion** which means that disabled and non-disabled pupils go to the same schools.

Comparison of Effort between Types

The level of effort is **rarely unaffected by circumstances**. For example, people with a **high socio-economic background** are more likely to have a **large number of years of education** than individuals whose parents have a low socio-economic status. Perhaps, the former are more likely to receive **help with their homework** or be **motivated** by their parents than the latter.

Justification

Therefore, Roemer argues that **not the level** of effort should be used for comparison but rather the **degree** of effort **within a type** measured by quantiles. With **strongly promoting parents** it might be **rather easy** to have 11 years of education whereas pupils with a **low SES** background might need **much more effort** and should rather be compared to high SES background pupils with 12 years of education.

Equal-Opportunity Policy

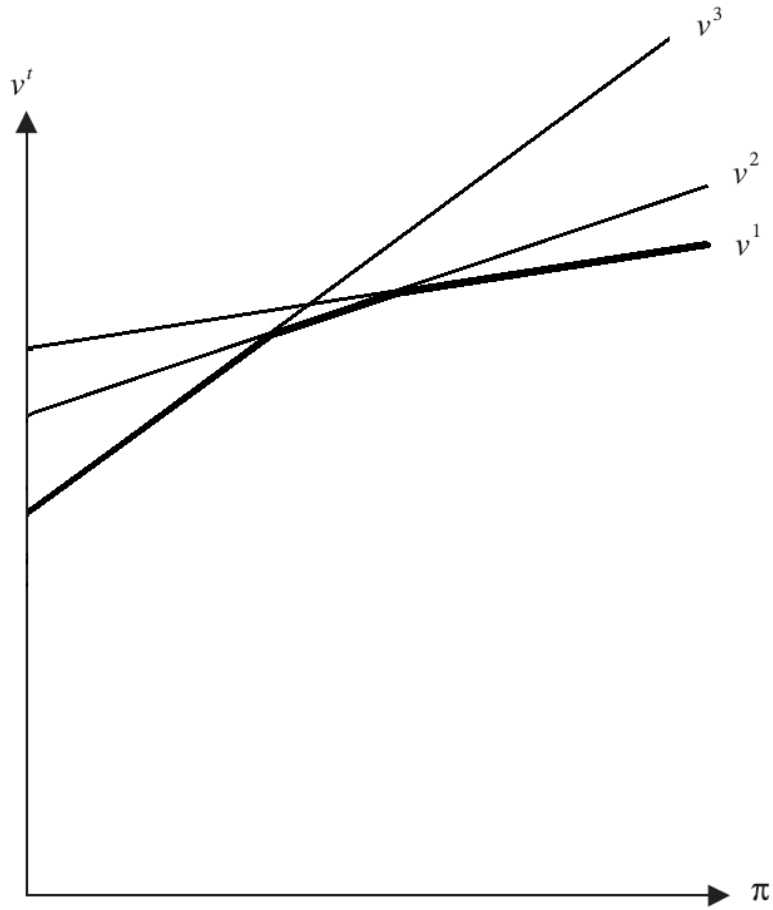
The **equal-opportunity policy** φ^{EOp} is defined by

$$\varphi^{EOp} = \text{Arg}\,\underset{\varphi}{\text{Max}} \int_0^1 \underset{t}{\text{Min}}\, v^t(\pi, \varphi)\, d\pi$$

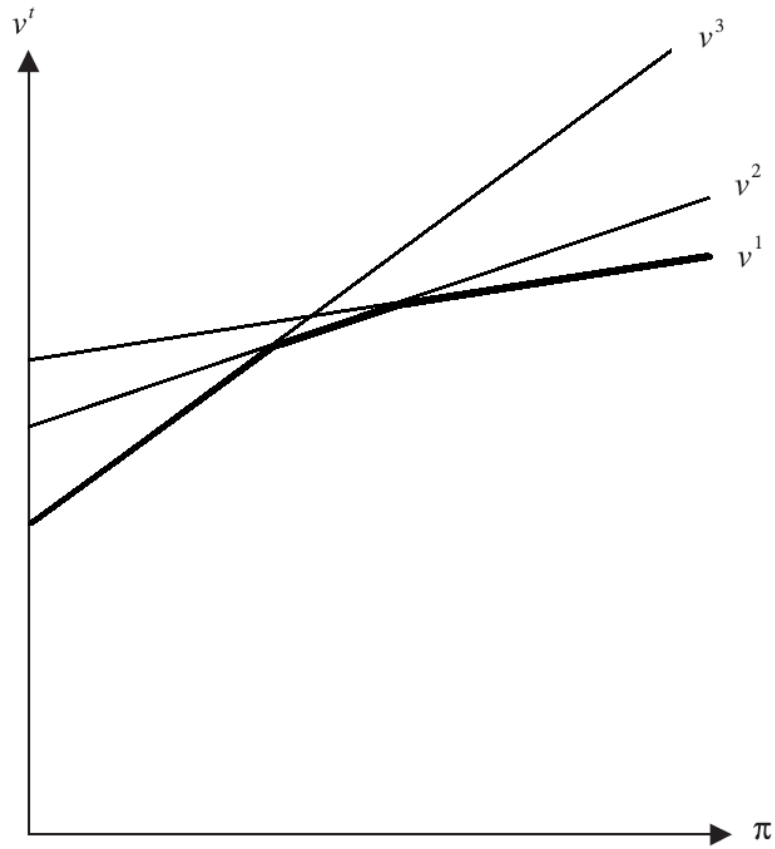
with

- t type
- π effort quantile of type t
- φ policy
- $v^t(\pi, \varphi)$ level of u for type t at π^{th} effort quantile.

Equal-Opportunity Policy: Illustration



(a) Policy A



(b) Policy B

Utilitarian and Rawlsian Policy

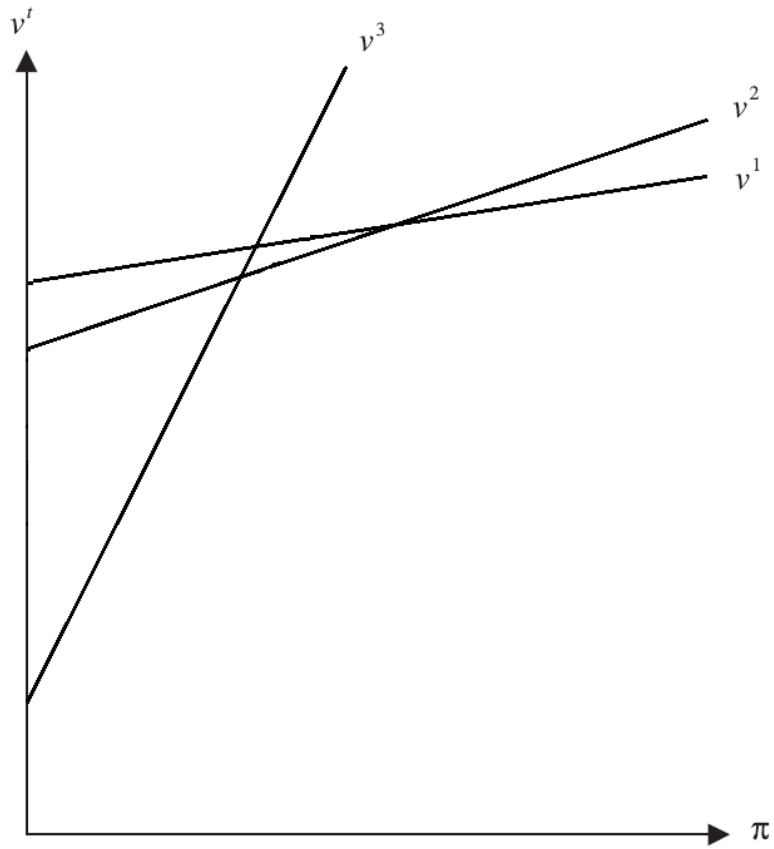
The **utilitarian policy** φ^U is defined by

$$\varphi^U = \text{Arg}\,\underset{\varphi}{\text{Max}} \sum_{t=1}^{\tau} p^t \int_0^1 v^t(\pi, \varphi)\, d\pi$$

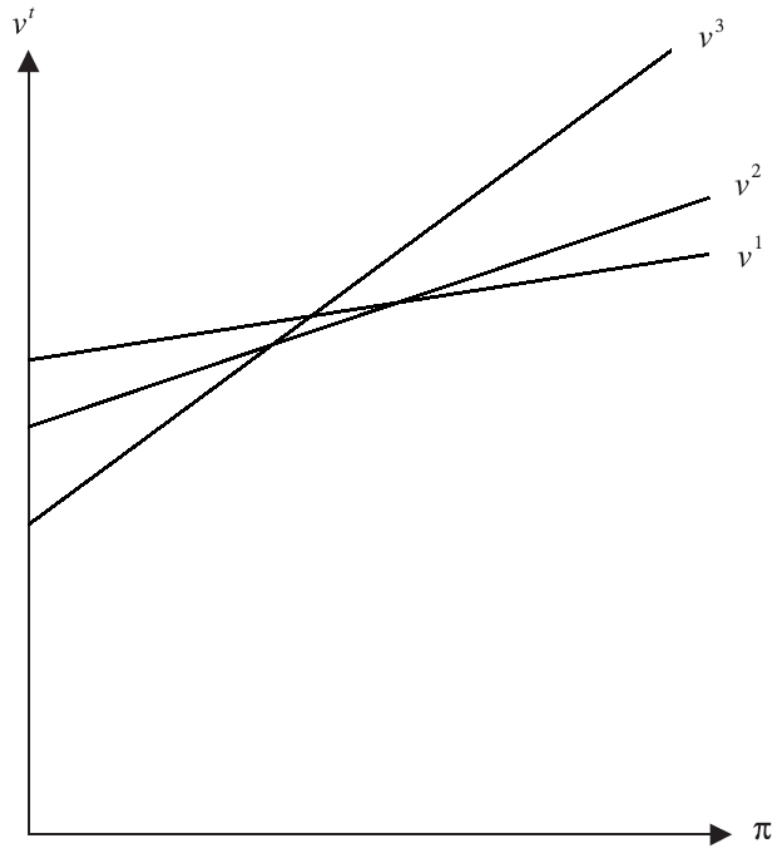
where p^t is the population fraction of type t, and the **Rawlsian policy** φ^R is defined by

$$\varphi^R = \text{Arg}\,\underset{\varphi}{\text{Max}}\,\underset{t,\pi}{\text{Min}}\, v^t(\pi, \varphi).$$

Utilitarian and Rawlsian Policy: Illustration



(a) Policy A



(b) Policy B

Comparison

The equal-opportunity policy **lies between** the utilitarian and the Rawlsian policy. If differences in outcomes are mainly due to differences in **circumstances**, it approaches the **Rawlsian policy**. But if the differences in outcomes are due to differences in **effort**, it approaches the **utilitarian policy**.

Topic I

In the US, there is a huge **variation in per capita educational expenditures** between school districts with an average of $2,500. The authors aim at identifying a policy that **equalizes wages at age 30** by reallocating financial resources such that wages are mainly determined by an **individual's effort** (years of education) and **not by their parents' education**.

Circumstances I

The authors define four groups of socio-economic backgrounds based on the more educated parent's level of education:

1. ≤ 8 years
2. > 8 years and < 12 years
3. 12 years
4. > 12 years

Equal-Opportunity Policy I

The authors identify the equal-opportunity policies under **two different conditions**. The first condition is that the average expenditure of the policy does **not exceed** the original average of **$2,500**. The second condition is that the expenditures for each type are **at least $2,500**.

Results I

r	x^1	x^2	x^3	x^4	w^{EOp}/w^{ER}
\$2,500	5,360	3,620	1,880	1,110	1.026
\$4,330	7,310	4,750	3,610	2,510	1.023

Topic II

Further, the authors consider differences between **black and white individuals**. In the dataset, **38.1%** of the individuals in the **lowest wage quintile** are black which is three times their share in the whole sample. The initial **equal-opportunity policy** is **not able to reduce this inequality** significantly.

Circumstances II

Again, the authors define four groups of backgrounds based on the more educated parent's level of education and the race:

1. black and ≤ 10 years
2. black and > 10 years
3. white and ≤ 12 years
4. white and > 12 years

Results II

r	x^{LB}	x^{HB}	x^{LW}	x^{HW}	w^{EOp}/w^{ER}
\$2,500	8,840	16,260	2,610	679	0.980
\$4,480	11,100	23,860	3,920	2,500	0.977

Topic

This study deals with the question how the **fiscal system** could account for **differences in incomes** between groups defined by their **parents' education**. Three types are considered: **elementary, secondary, or tertiary** education.
Ten countries are considered: Belgium, Germany, Denmark, Italy, the Netherlands, Norway, Spain, Sweden, the UK, and the US.

Utility Function

The utility functions are defined as

$$u(y, L) = y - \alpha L^{1+1/\eta}$$
$$y = (1 - a)\, x + c$$

where

- y post-fisc income
- L labor
- η elasticity of labor supply
- x pre-fisc income
- a marginal tax rate
- c transfer.

Equal-Opportunity Policy

As the distribution functions of income **do not cross**, the equal-opportunity policy is defined as the tax system which **maximizes the average post-fisc income of the worst-off type**.

Results

Country	a^{obs}	c^{obs}	a^{EOp}	c^{EOp}	v
Belgium	0.531	148.9	0.535	158.	0.9996
Germany	0.364	5540.	0	−17477	Over tax
Denmark	0.440	41021	0	−53989	Over tax
Italy	0.232	2.69	0.819	21.3	0.160
Netherlands	0.533	10410	0.474	18736	Over tax
Norway	0.393	45526	0	−63170	Over tax
Spain	0.376	172.8	0.605	663.9	0.748
Sweden	0.524	46886	0	−30207	Over tax
Britain	0.364	38.43	0.709	171.5	0.615
US	0.243	2036.	0.647	13578	0.200

Key: a^{obs} = the observed marginal tax rate; c^{obs} = the observed average transfer a^{EOp} = marginal tax rate in the EOp policy; c^{EOp} = average transfer in the EOp policy; v = extent to which observed policy achieves equality of opportunity