

## 2. Welfare economics and the rationale for public intervention

(Stiglitz ch.3, 4, 5; Gruber ch.2,5,6,7; Rosen ch. 4,5,6, 8; Salverda et al. (2009), The Oxford handbook of economic inequality, Oxford University Press ch.3, ch.4,ch.25, ch.26)

- 2.1. The two fundamental theorems of Welfare Economics
- 2.2. Social efficiency: perfect competition and Pareto Efficiency; measuring social efficiency
- **2.3. Equity: From Social Efficiency to Social Welfare**

---

## 2.2. From social efficiency to social welfare - Equity issues (Stiglitz ch.5, Gruber ch.2; Rosen ch.4)

- We have seen how to achieve Pareto efficiency: according to the **first theorem of welfare economics** an equilibrium allocation achieved by a **set of competitive markets** is **Pareto efficient**
  - The level of social welfare depends however on **both social efficiency and an equitable distribution of resources**. Pareto Efficiency is not sufficient to guarantee equity in income distribution according to social values. **Value judgments** are required on the fairness of distribution of utility among individuals.
-

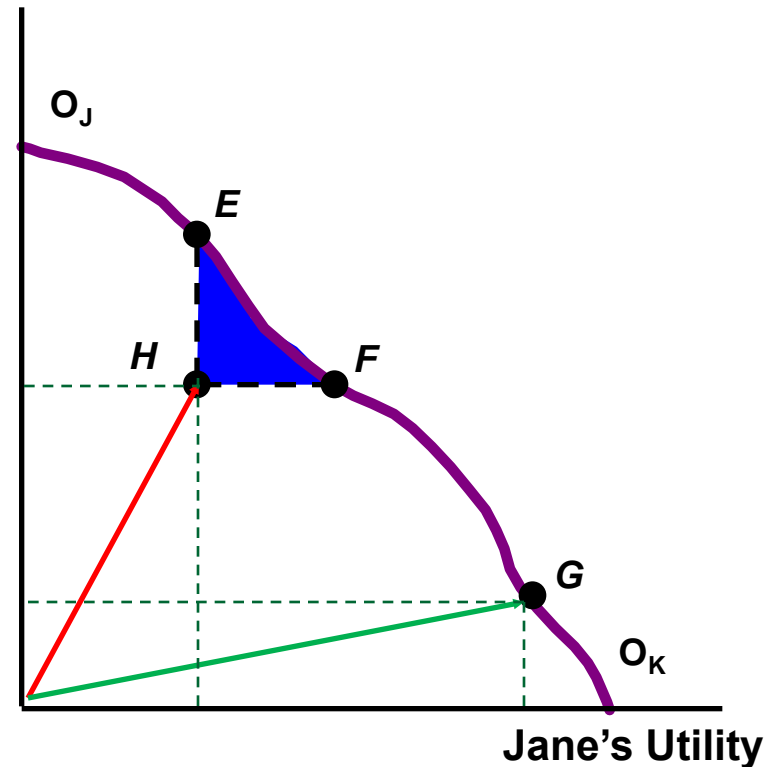
# The Utility Possibilities Frontier and the Social Welfare Function (SWF)

- How do we define social values? How does the government decide who should have more and who should have less in society?
- We model the equity-efficiency decisions using the concepts of the **Utility Possibilities Frontier (UPF)** and the **Social Welfare Function (SWF)**.
- Society has a whole series of Pareto Efficient points deriving from different initial allocations of available resources among individuals. These points are represented on the **Utility Possibilities Frontier (UPF)** which describes the highest available level of utility (or welfare) attainable by one individual (or group of individuals) given the levels of utility attainable by others.

# The Utility Possibilities Frontier

- ❑ Consider distributions  $F$ ,  $G$  and  $H$ :  **$F$  and  $G$  are Pareto efficient,  $H$  is not**
- ❑ Which distribution is more equitable? It depends on perspective.
  - **$H$**  may be **more equitable** than  $F$  and  $G$  because the distribution of utilities is more equal, but it is possible to have Pareto Improvements in the blue shaded area.
  - **$F$  and  $G$**  are both Pareto efficient, how do we choose between them?
  - We use **Social Welfare Functions** which are represented by **Social Indifference Curves**

Sam's  
Utility



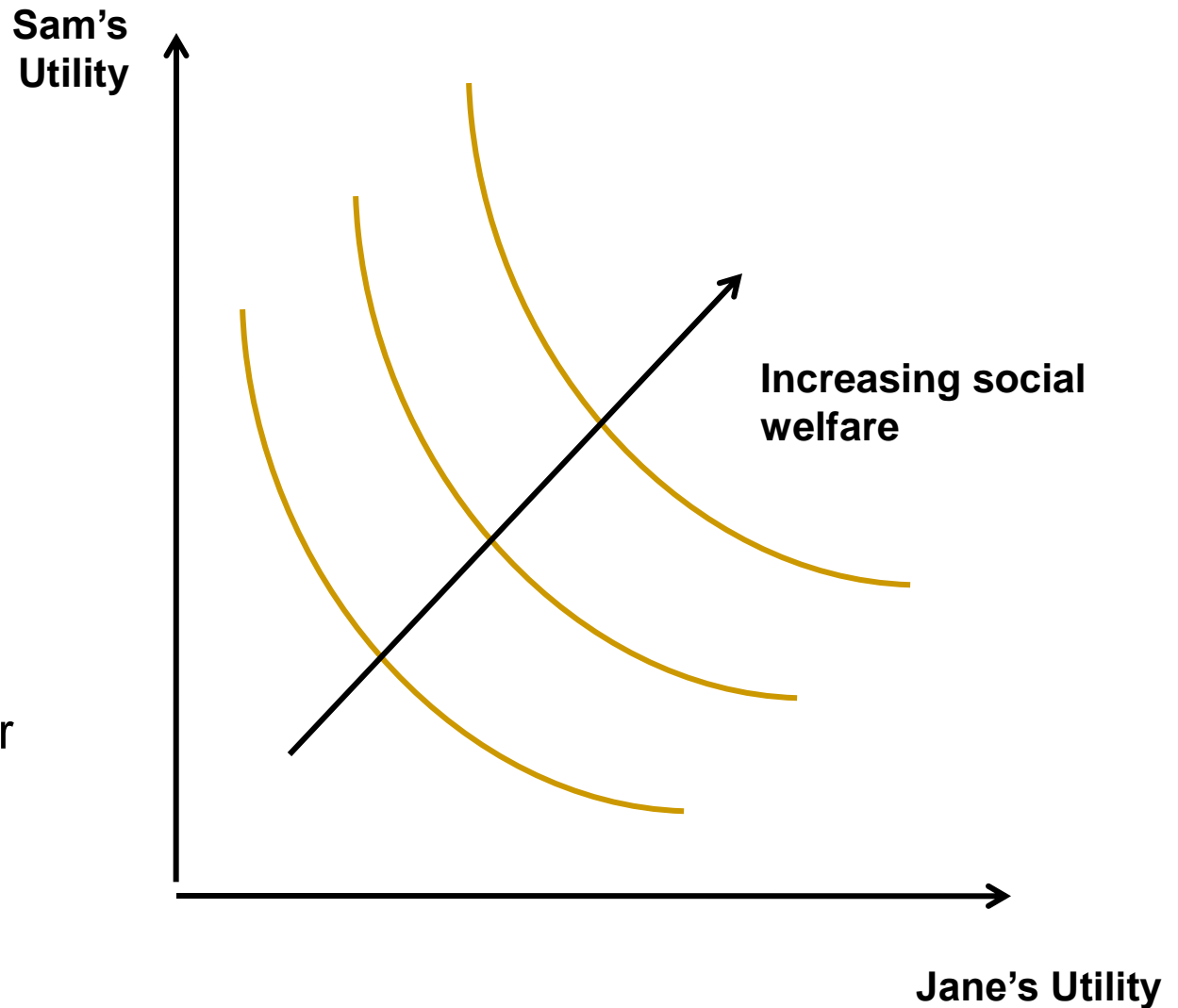
# The Social Welfare Function

- How does society select the socially preferred point along the UPF? Society can choose among PE points according to a **Social Welfare Function** which represents society preferences in relation to possible combinations of the utilities of different individuals or groups.
- The **Social Welfare Function (SWF)** combines the utility functions of all individuals into an overall social utility function:  $W = F(U_{\text{jane}}, U_{\text{sam}})$

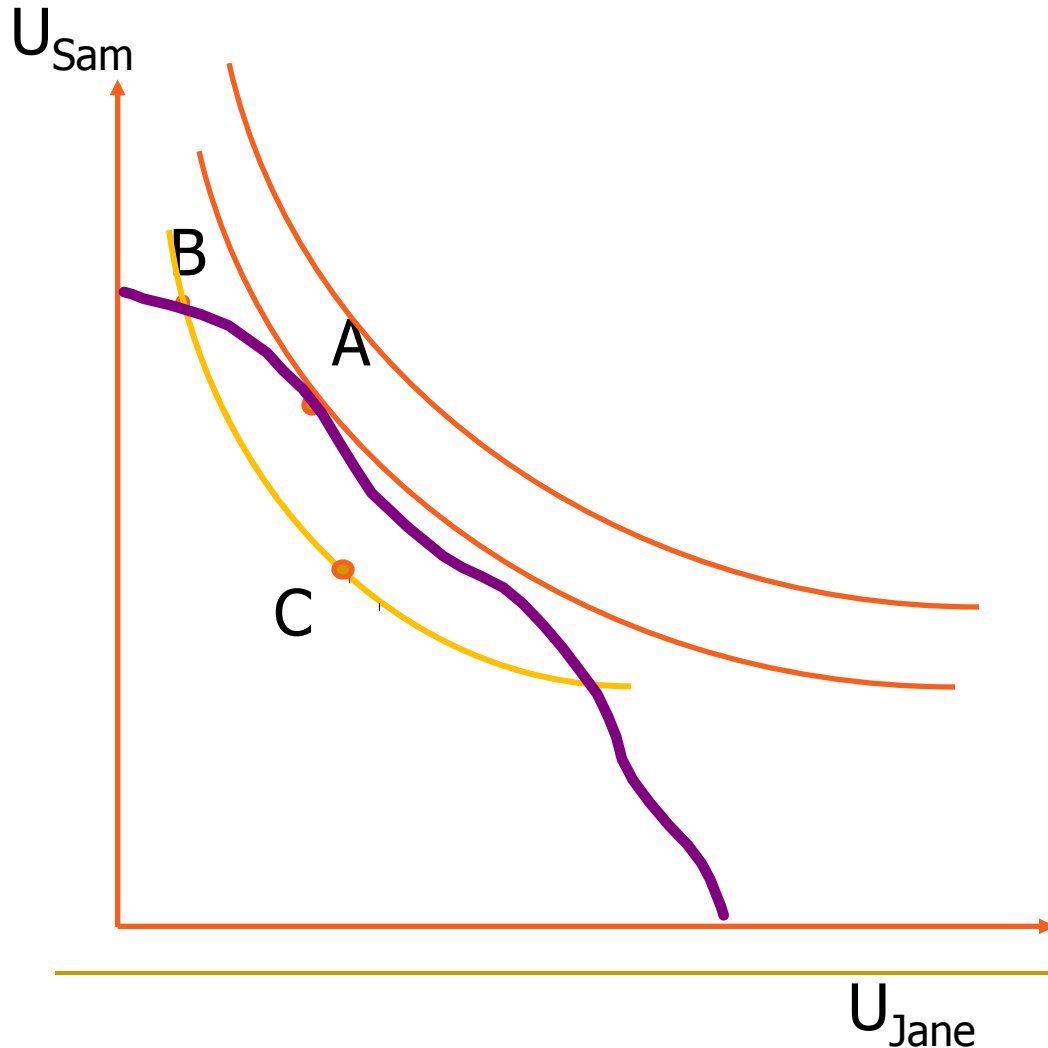


## Social Indifference curves

Social Indifference curves (similar to individual indifference curves) summarise **all the allocations with identical levels of social welfare**. Their shape reflects different views of society about distribution.



# Using social indifference curves to choose the socially preferred allocation of resources



Both B and A on the UPF are Pareto efficient. How does society choose between these PE points? On the basis of a SWF represented by Social Indifference curves .

**A is socially efficient because it is on the UPF and it is preferred to B because it is on a higher Social Indifference Curve.**

**C** would be more equitable than A, but it is not efficient

# How do we derive a Social Welfare Function?

- Using the same framework of the individual consumer choice
- Assumptions:
  - Assume that **utility comparisons are meaningful**.
  - Assume the **possibility to aggregate individuals' utilities** in a Social Welfare Function described by Social Indifference Curves.
  - The **Social Welfare Function** gives the level of social welfare corresponding to a particular set of utility levels attained by different individuals.
  - **Social Indifference Curves** define the set of combinations of utilities of different individuals that yields the same level of Social Welfare to society.
  - Along each Social Indifference Curve the combination of individuals' utilities gives the same level of social welfare
- **Society preferred (first best) point on the utility possibilities curve is the one at which the social indifference curve is tangent to the utility possibilities curve.**



# The efficiency-equity trade off and the SWF

The SWF and Social Indifference Curves **may take different forms** which reflect society views on the trade off between equity and efficiency.

If the government and society **care solely about efficiency**, then the competitive market outcome will be the most efficient one, even if it may be not equitable: **resources go to those that value them most and make them most profitable (equality of opportunities, merit based).**

If the government and society **care also about the distribution of resources** then the outcome will be **compensating lower efficiency with greater equity** in the distribution of resources. **Resources go to the poorest in society (equality of results-needs based).**

# Two Views of Equity...and shapes of Social Indifference Curves

## ■ Utilitarian (Bentham)

- All members of society receive the same level of utility:

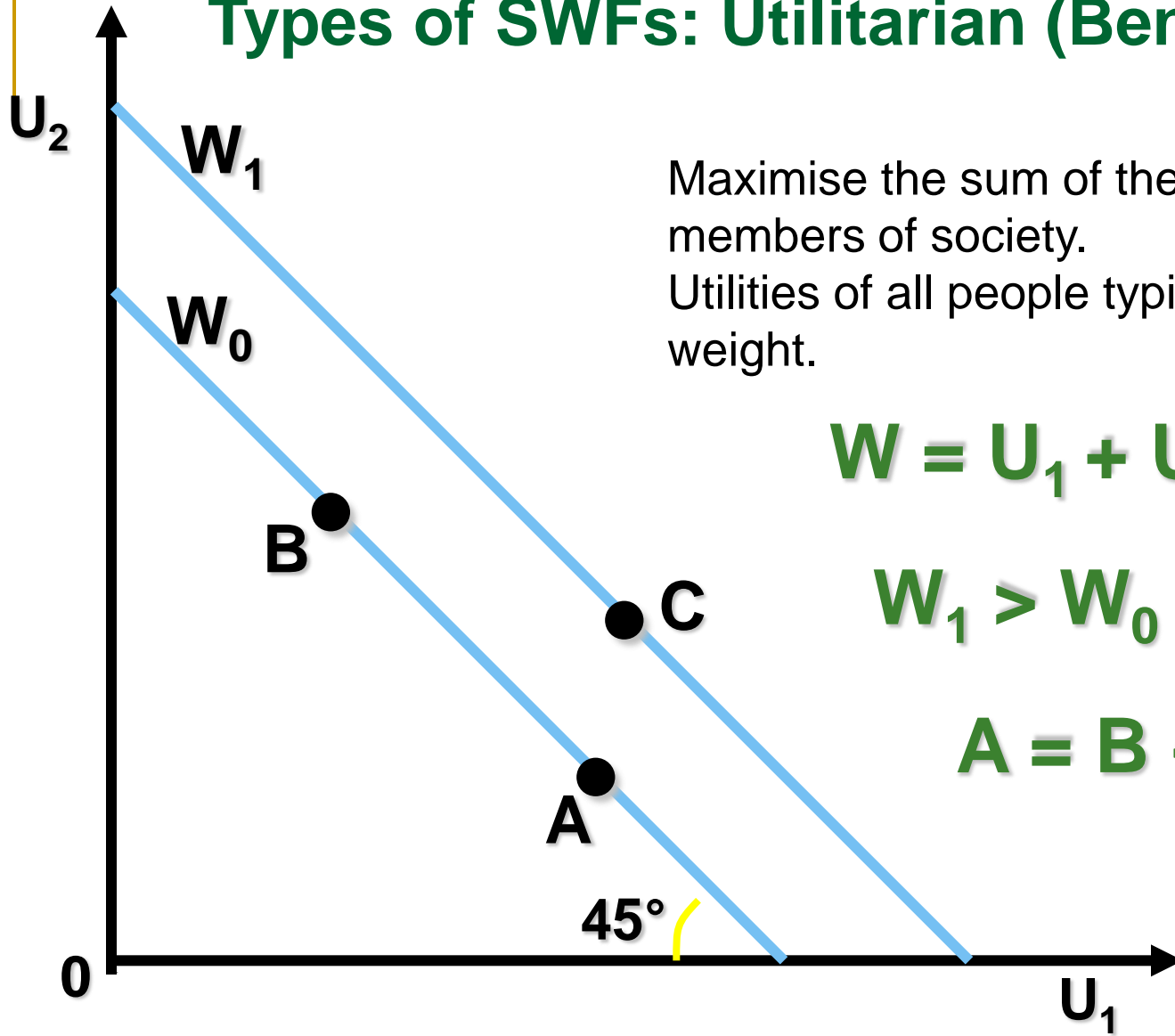
$$SWF=U_a+U_b+U_c+\dots+U_n$$

- **The utilities of all individuals are given equal weight.**
- Society is indifferent between who is getting more (the rich or the poor), as long as the person values at least as much as the other the additional unit of resources.
- However, since the marginal utility of income is diminishing, the poor will have a higher MU than the rich and society will prefer to redistribute income from the rich to the poor
- **The utilitarian SWF is maximized with a perfectly equal distribution of income**

## ■ Rawlsian

- **Maximize the utility of the least-well-off person:  $SWF=\min(U_a,U_b,\dots,U_n)$**
- Social welfare is maximized by maximizing the well-being of the worst off person in society
- Improvements in the utilities of the richest do not improve social welfare

# Types of SWFs: Utilitarian (Bentham)



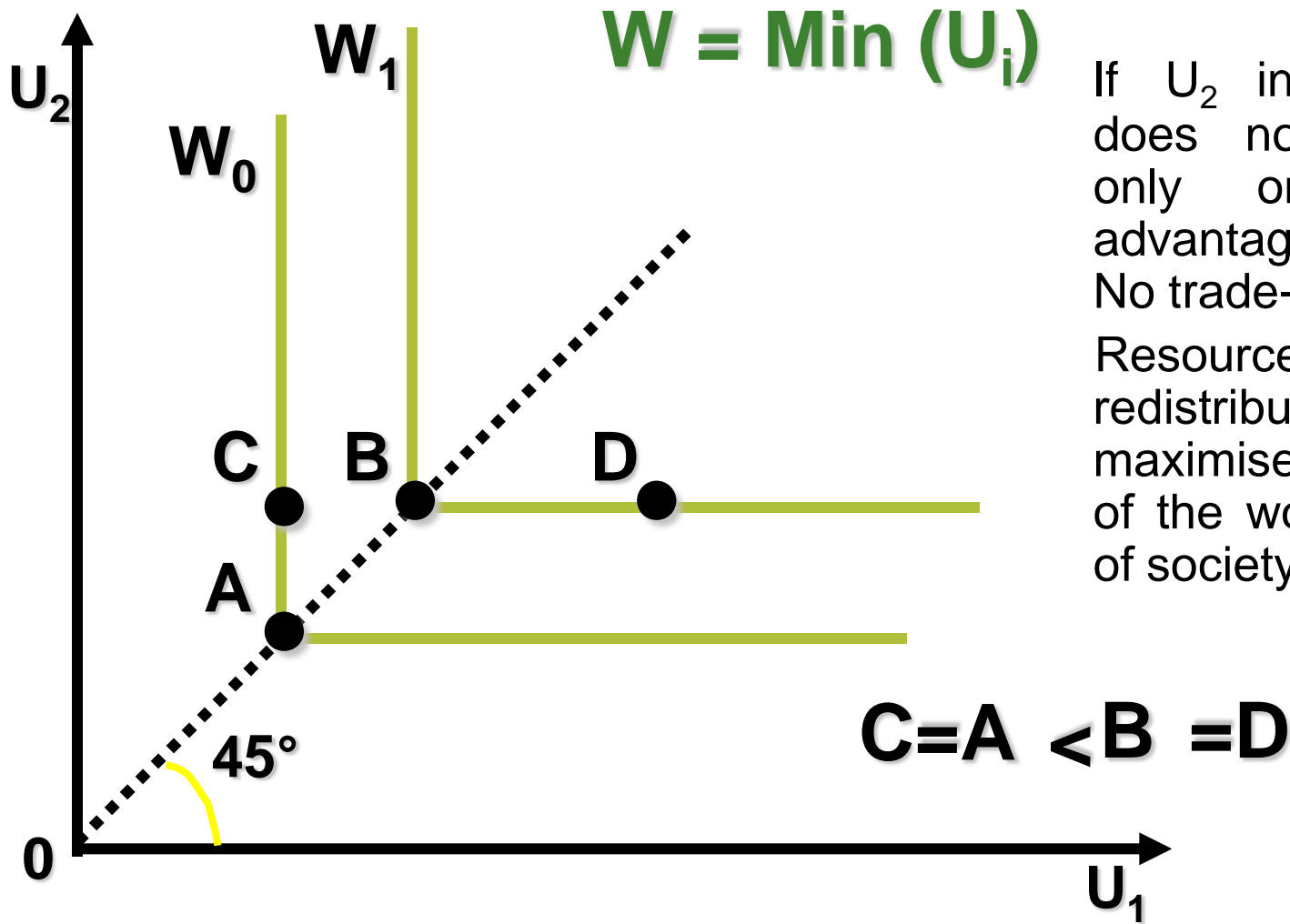
Maximise the sum of the utilities of all members of society.  
Utilities of all people typically given equal weight.

$$W = U_1 + U_2$$

$$W_1 > W_0$$

$$A = B < C$$

# Social welfare functions: Rawlsian



If  $U_2$  increases, SWF does not. It depends only on  $U_1$  (least advantaged individuals). No trade-off.

Resources should be redistributed so to maximise the well-being of the worst-off member of society

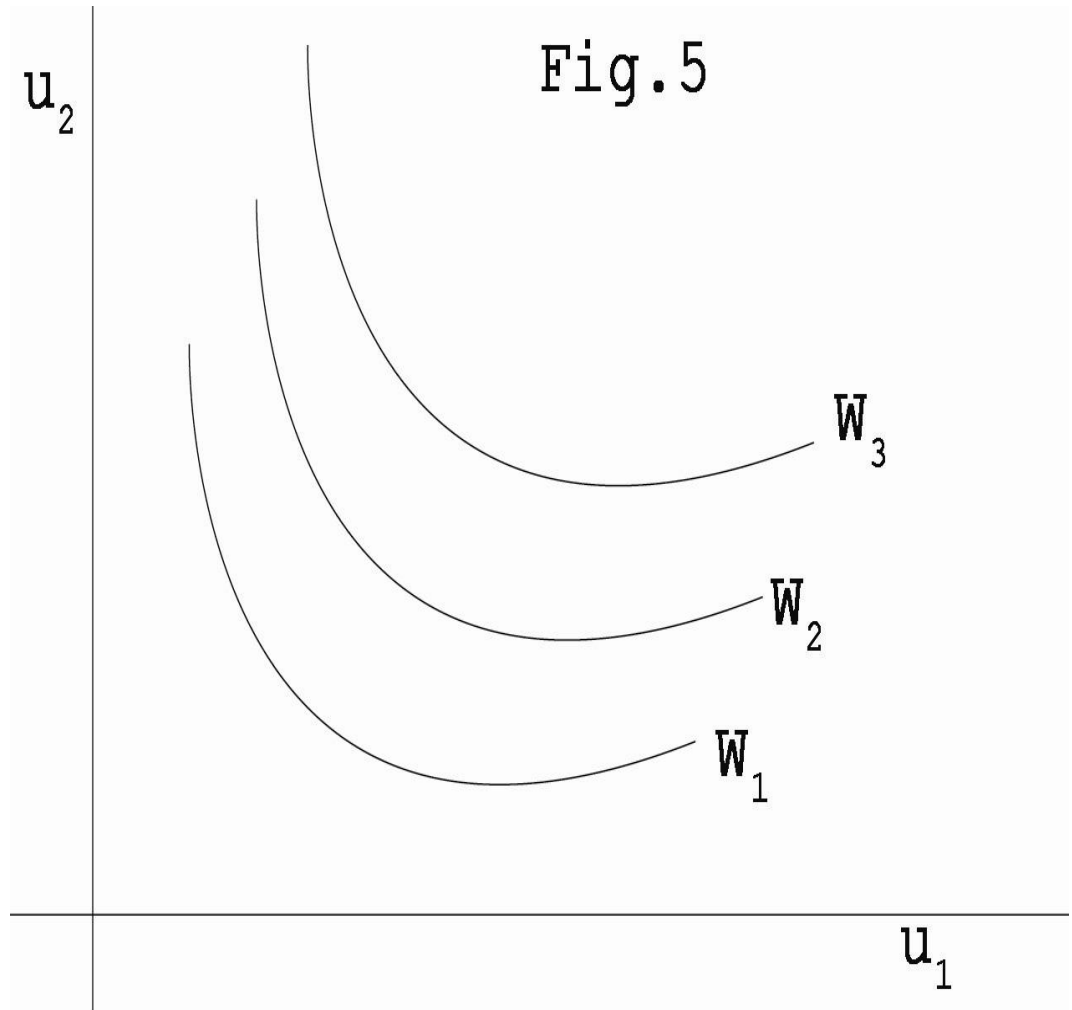
# Types of SWFs: middle of the road

## SWF

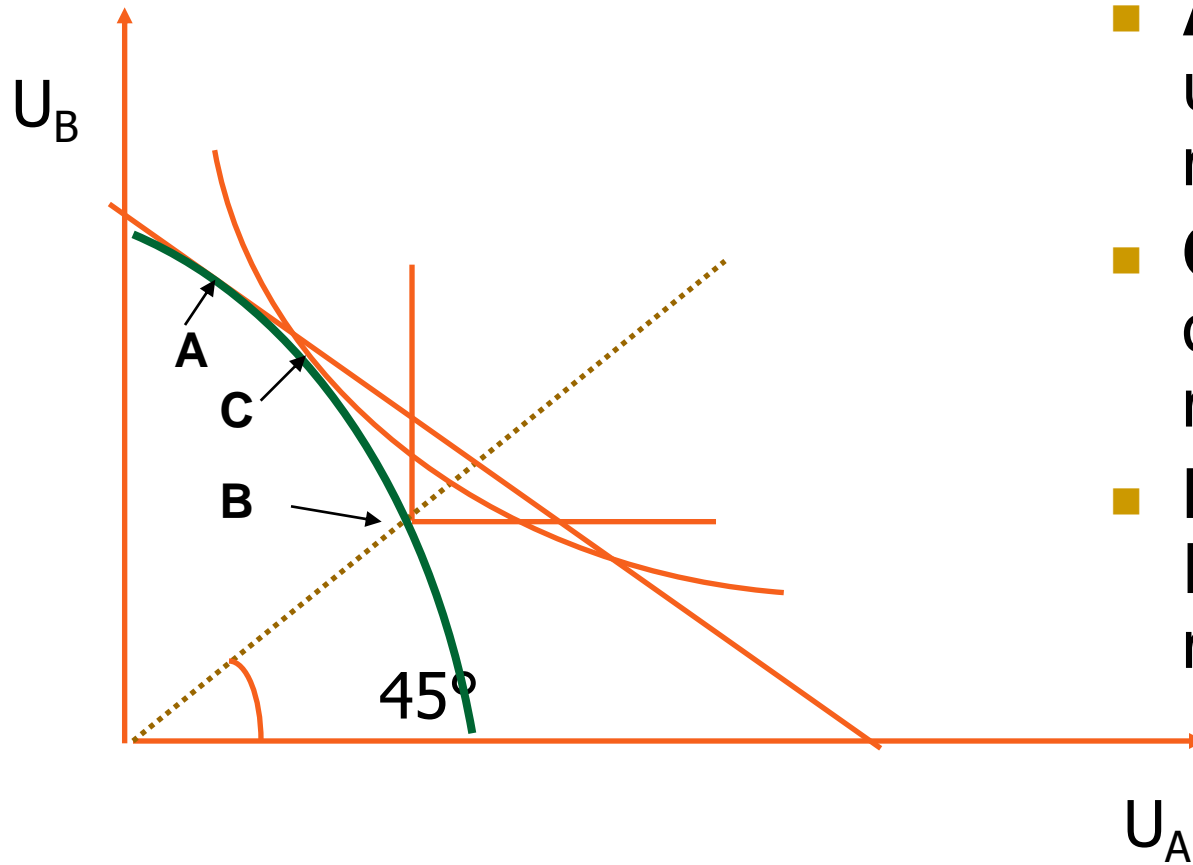
**Social preferences are convex (decreasing marginal utilities).**

**These functions are midway between Bentham and Rawls functions**

**Society accepts a decline in the utility of the poor only if compensated by a much larger increase in the utility of the rich**



# Different forms of social welfare (social preferences) produce different results (social choices), given the UPF



- **A** is a utilitarian maximum
- **C** is a middle of the road maximum
- **B** is a Rawlsian maximum

---

# Main problems with SWF approach

- **Representation of individual preferences and definition of the aggregation rule (Arrow impossibility theorem):** Given ordinal & non-comparable individual utility functions, no SWF exists (except dictatorship)
  - **Measurement of utility**
  - **Ipothesys on the possibility to make interpersonal comparisons**
-

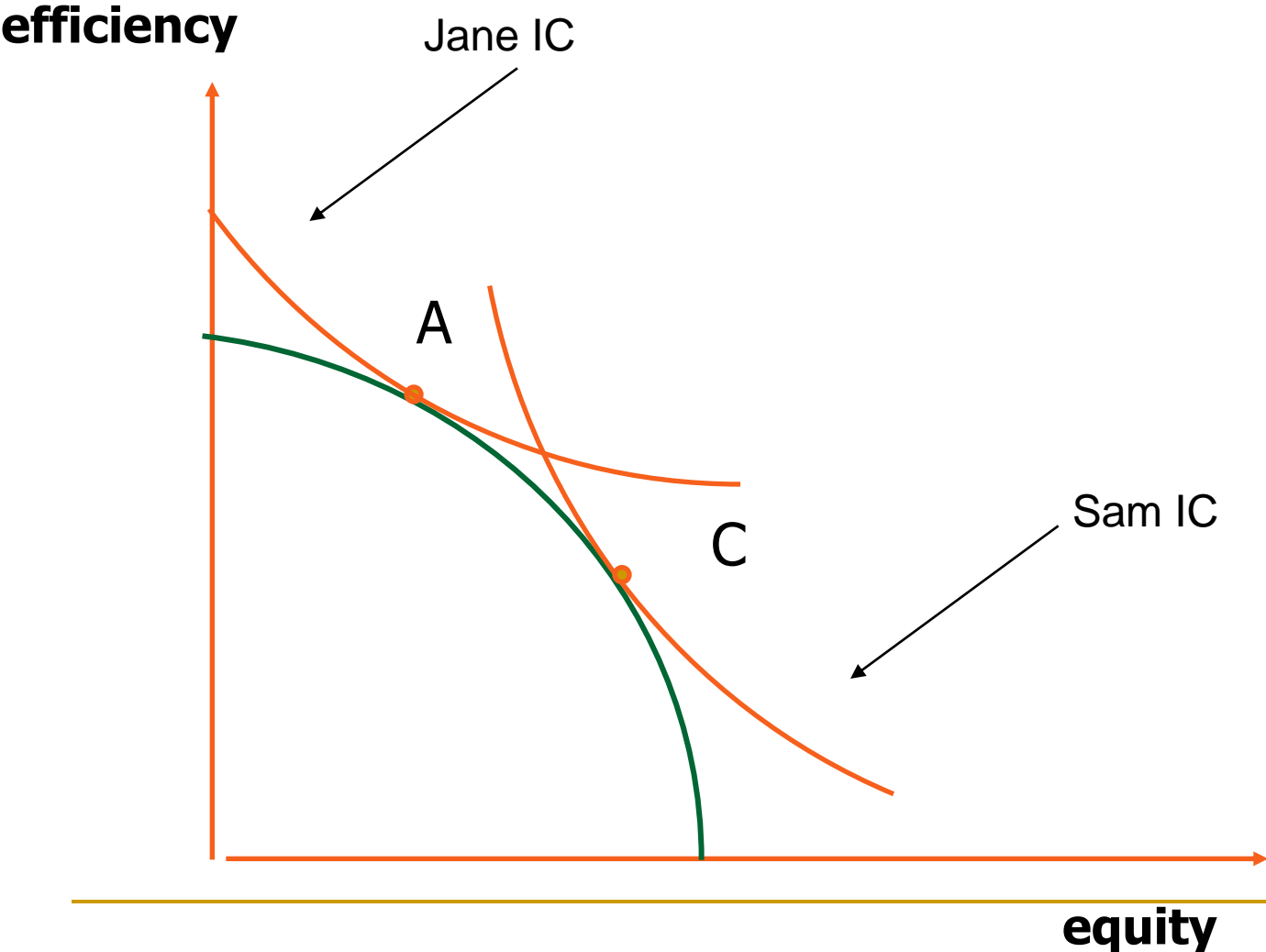
---

# Efficiency and distribution trade offs: analysing social choices

- There is **no objective way to define what is equitable**, because its definition depends on social values. For example there are different concepts of equity: **equality of opportunities (initial conditions, rules) vs equality of outcomes**
  - In addition there is **disagreement about the nature of the efficiency-equity trade off**: how much efficiency should we give up to achieve more equity?
  - There is **disagreement on the weight to give to equity values relative to efficiency ones**. These disagreements relate to **social choices**
-

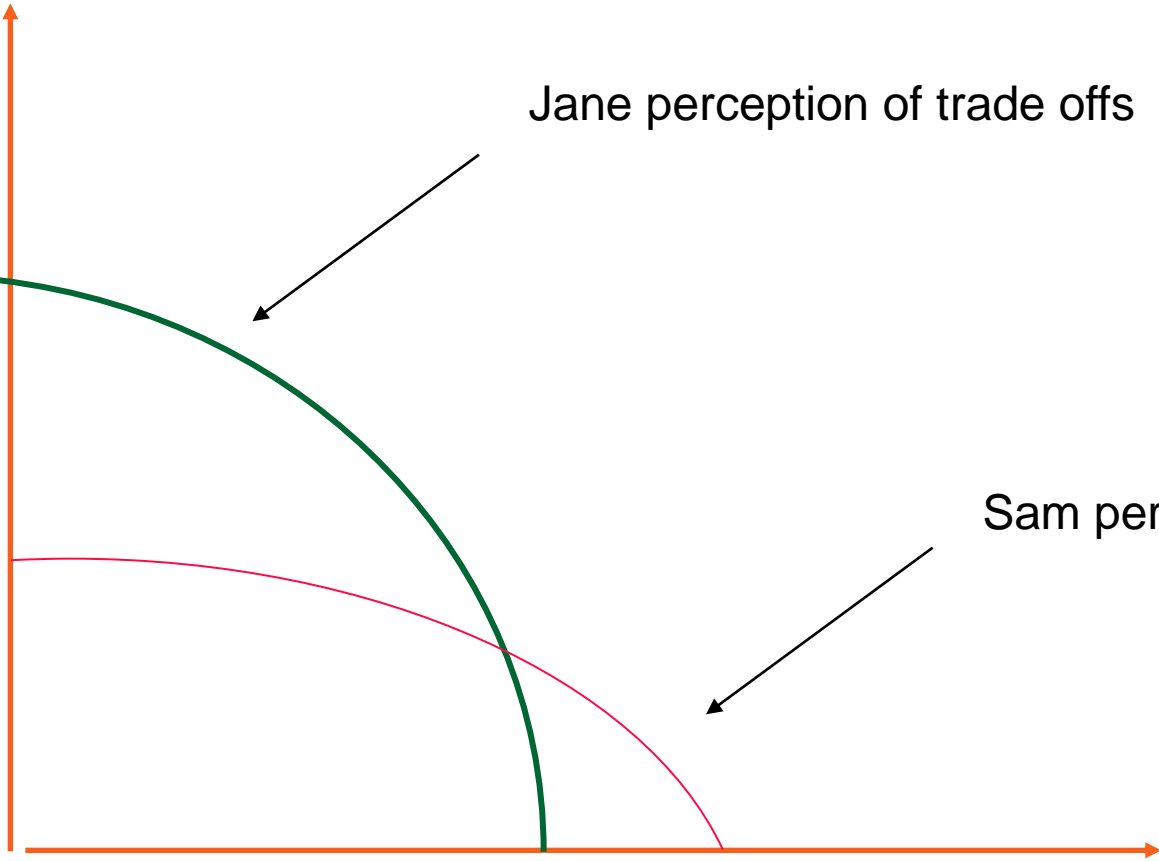


Jane and Sam have the same perceptions on trade offs, but different values



Jane and Sam have different perceptions on trade offs

efficiency



Jane perception of trade offs

Sam perception of trade offs

equity

---

# Alternative visions of equity produce different social choices

- Equality of opportunities (rules, initial conditions)
- Equity of results

Examples:

1. Should we give unemployment benefits to those who are without a job or only to those unemployed who actively search for and find a job?
  2. Should public health assistance pay for a lung transplant to a person who has been heavily smoking all his life or not (even if this would mean his death)?
  3. Should the government impose pension savings and/or mandatory life belts?
-

# The political process

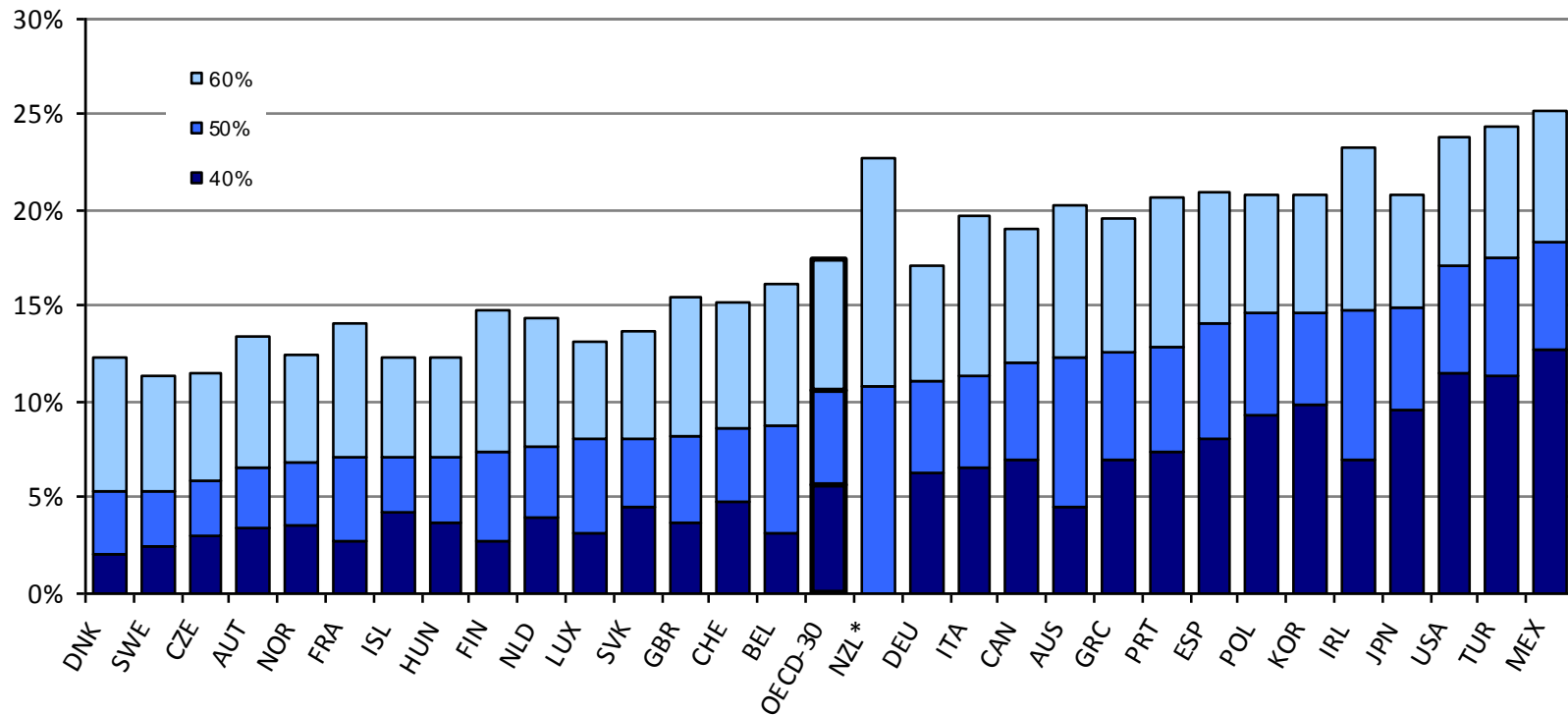
- How decisions are taken in democracy is important: how are different values and perceptions of trade offs considered?
- **Arrow Impossibility Theorem:** there is no general way to aggregate preferences without running into some kind of irrationality or unfairness. Arrow was able to prove mathematically that there is no method for constructing social preferences from arbitrary individual preferences. For this major result and other work Kenneth Arrow received the Nobel prize in economics.
- In order to understand and evaluate the results of a programme it is important to assess the political process which led to its design and implementation: i.e. the stakeholders involved and mediation process involved, the implementation procedures and institutions,. etc. (process evaluation)

# Measuring distributional effects (equity)

- Difficult because different groups of individuals may be affected differently by a programme
- Usually the impact of a programme is considered on some measure of inequality:
  - **poverty index**: fraction of a population whose income is below a critical threshold
  - **poverty gap**: it measures how far below the poverty threshold people are
  - The **Lorenz Curve**: cumulative fraction of the country's total income earned by the poorest 5%, the poorest 10%, the poorest 15% etc. With complete equality the Lorenz curve would be a straight line.
  - **Gini Coefficient**: derived from the Lorenz curve

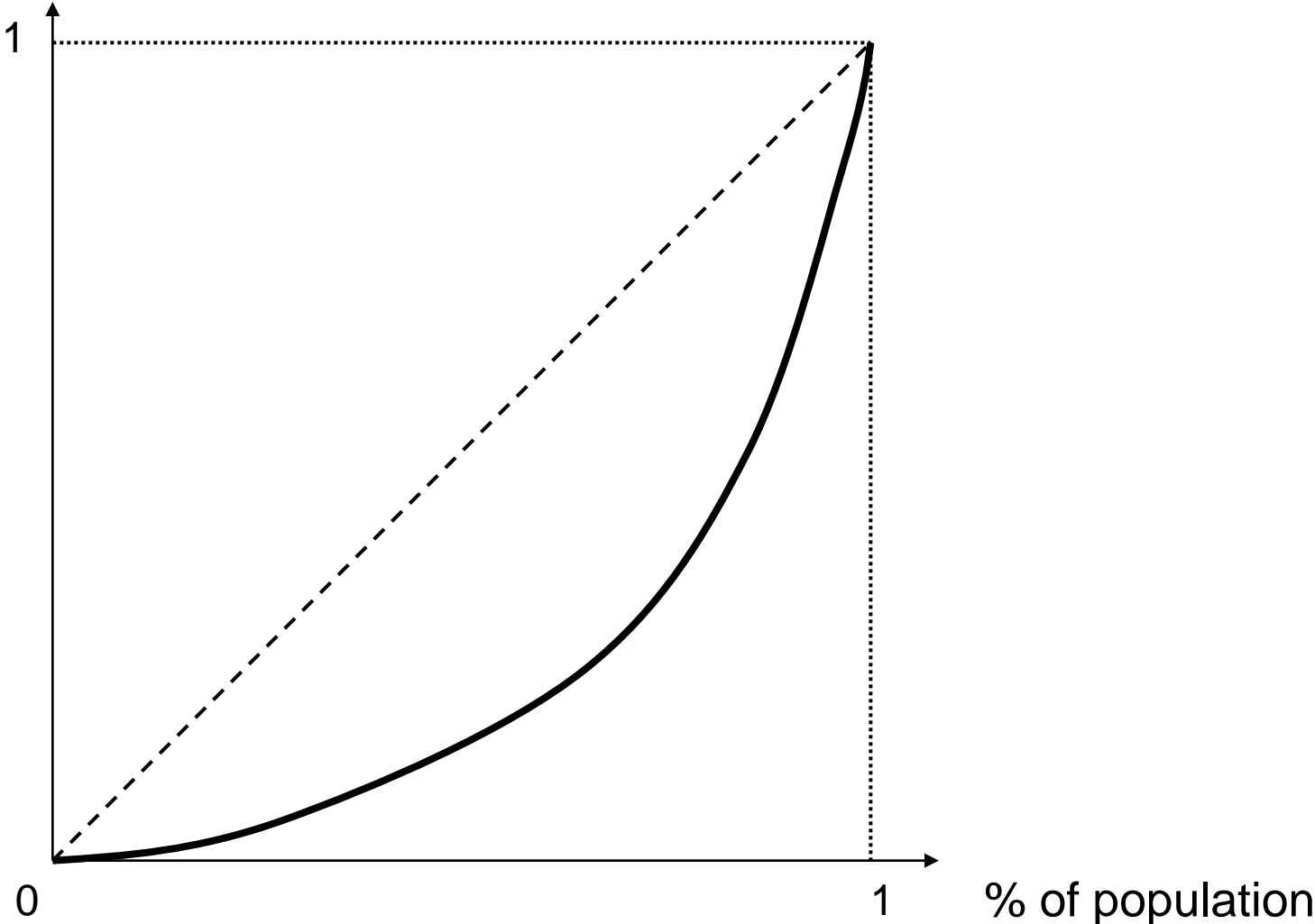
**Poverty rates:** share of individuals with equivalised disposable income (adjusted for household size) less than 40, 50 and 60% of the median for the entire population. Countries are ranked, from left to right, in increasing order of income poverty rates at the 50% median threshold.

Figure 5.1. Relative poverty rates for different income thresholds, mid-2000s



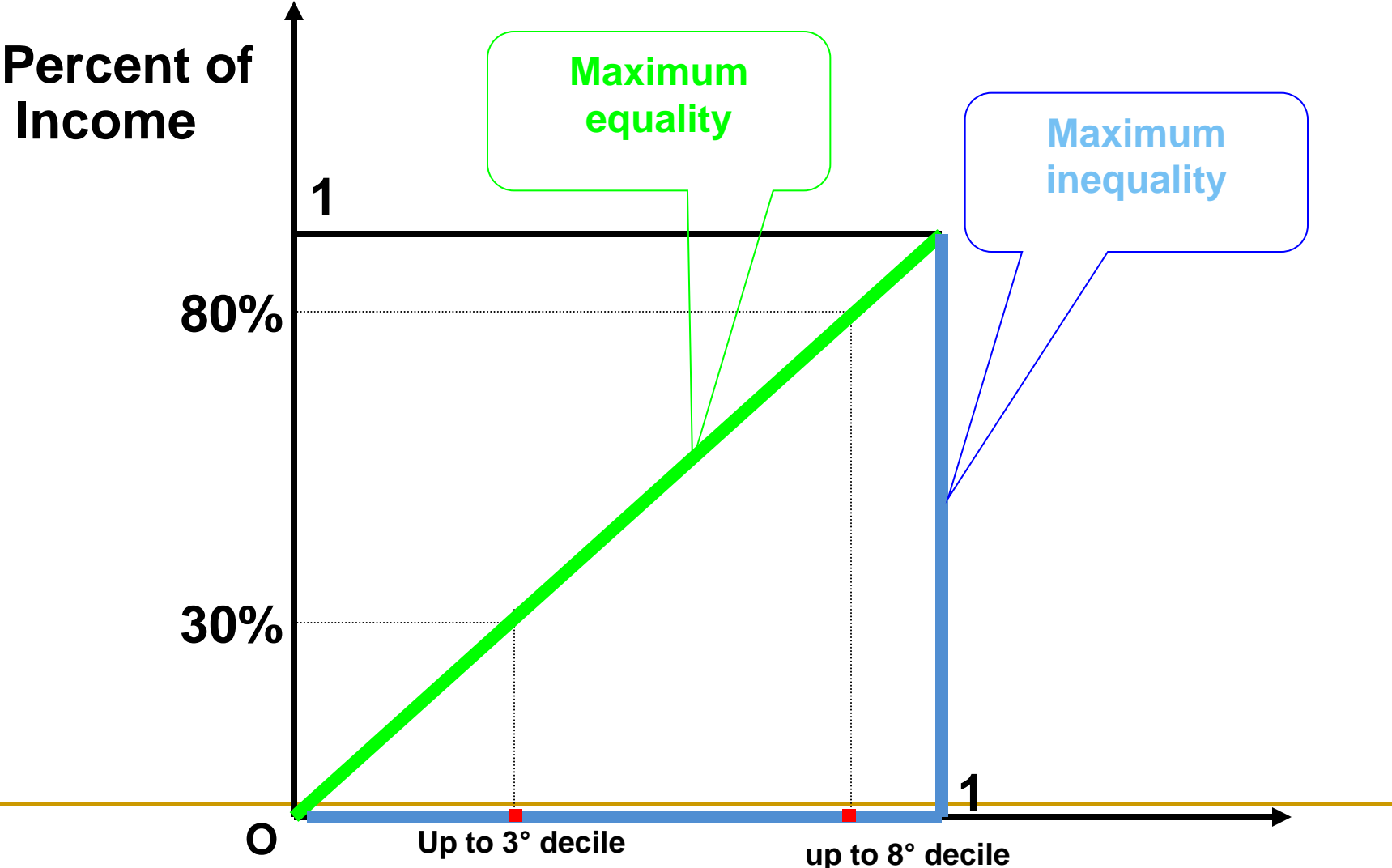
# The Lorenz Curve

% of total income



% of population

# Lorenz Curve





# Gini Index

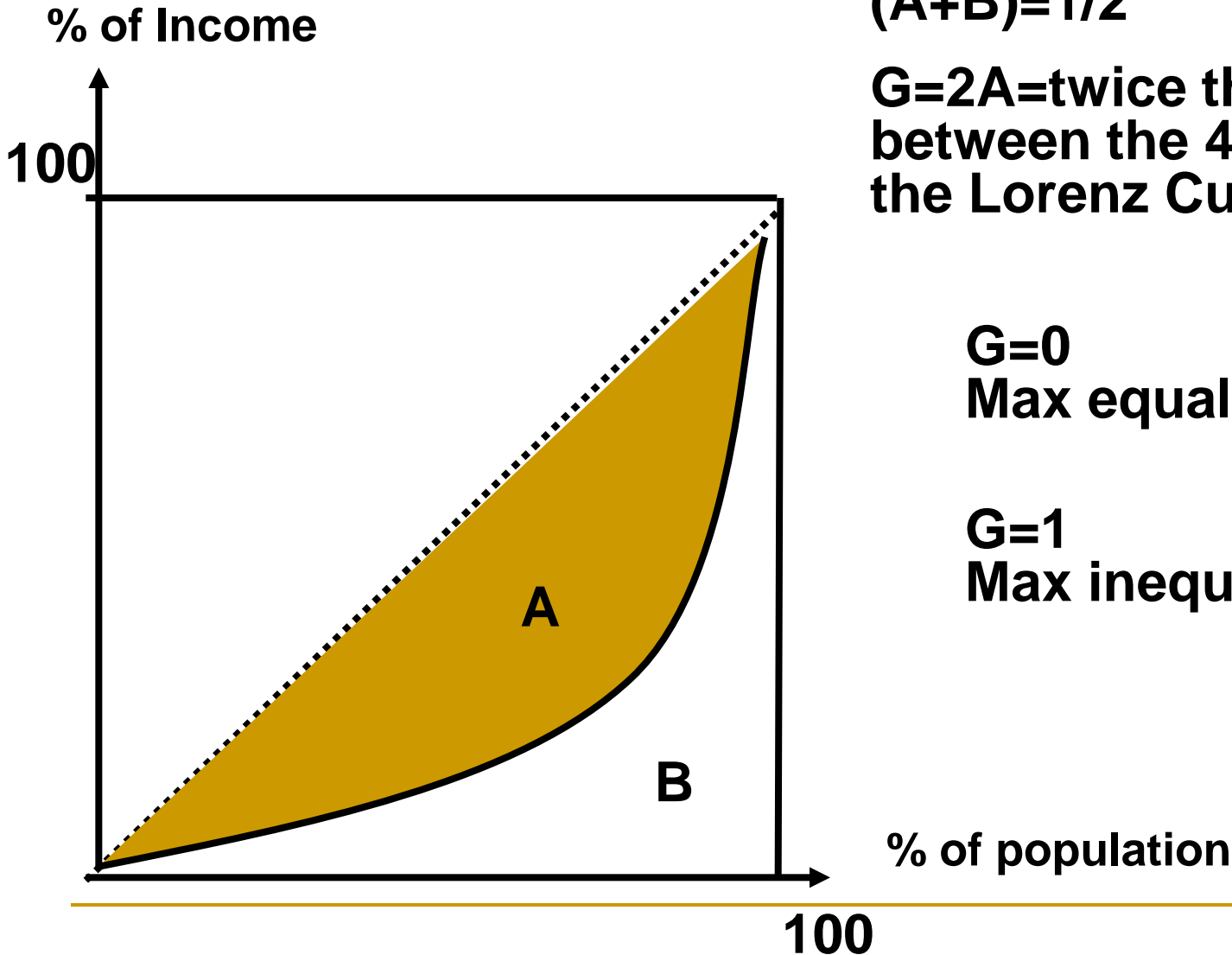
$$G = A / (A + B)$$

$$(A + B) = 1/2$$

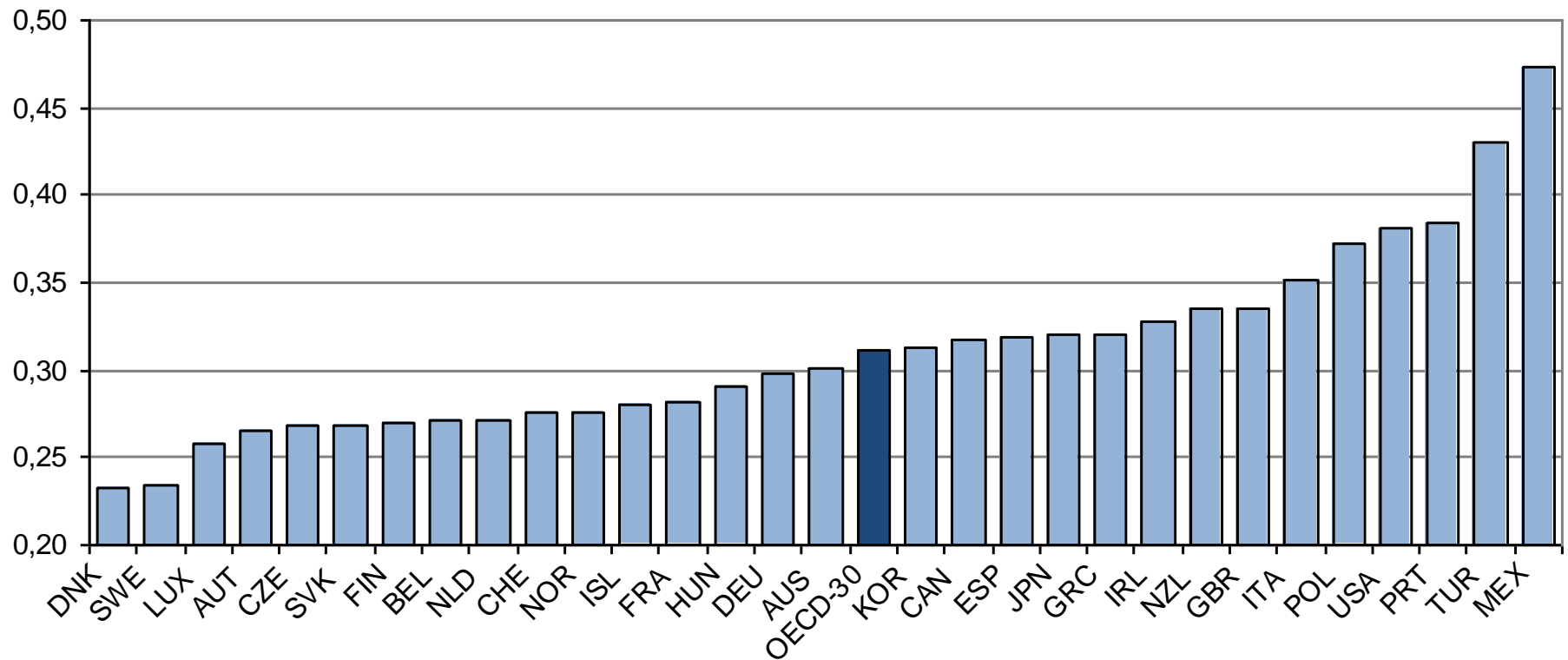
$G = 2A =$  twice the area between the 45° line and the Lorenz Curve

$G = 0$   
Max equality

$G = 1$   
Max inequality



# Gini coefficients of income inequality in OECD countries, mid-2000s



# Social choices in practice: STEPS TO BE TAKEN in deciding government intervention

1. Identify and measure the net benefits (benefits- costs) received by different population groups
2. Ascertain if the programme is a Pareto improvement (every one is better off). IF IT IS →ADOPT IT
3. If it is not: measure efficiency and equity results for different groups:
  - **Efficiency:** by summing gains and losses for each individual/group
  - **Equity:** by considering some overall measure of inequality in society
  - If gains>losses *and* reductions in inequality →ADOPT IT
  - If gains>losses *but* increases in inequality (or vice-versa)



Evaluate the trade off defining how much extra inequality society is willing to accept for an increase in efficiency (or vice versa) and define compensation measures.

# Three approaches to social choices

- How are social choices taken when benefits and costs are distributed unevenly among the population?
- Identify the groups of individuals that are better off and those that are worse off and the gains and losses of each major groups, Then:
  - **Compensation principle**: ascertain whether aggregate net benefits are positive. If so society should undertake these programmes, compensating those adversely affected. A programme is desirable if it is hypothetically possible for gainers to compensate losers and still be better off. Equity (**who** gains and **who** loses) is not considered.
  - **Trading off measures**: Adopt only those programmes where the increase in efficiency is worth the increase in inequality and vice versa
  - **Weighted benefits approach**: Calculate weighted net benefits, weighting gains and losses to the poor more heavily than those to the rich, according to the social welfare function (Rawls).