

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 chs.3, 4, 25, 26; OECD, Growth and income inequality: trends and policy implication; OECD Economic policy notes no.26, April 2015 <https://www.oecd.org/eco/labour/Growth-and-income-inequality-trends-and-policy-implications.pdf>)

- ❑ 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 in competitive markets is Pareto efficient (social efficiency)**.
- The level of social welfare depends however **also on 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 the distribution of utility among individuals.
- **How do we define social values?** How does the government decide who should have more and who should have less in society; or on what to invest: e.g. education or defence? Supporting arts or scientific research; ...?

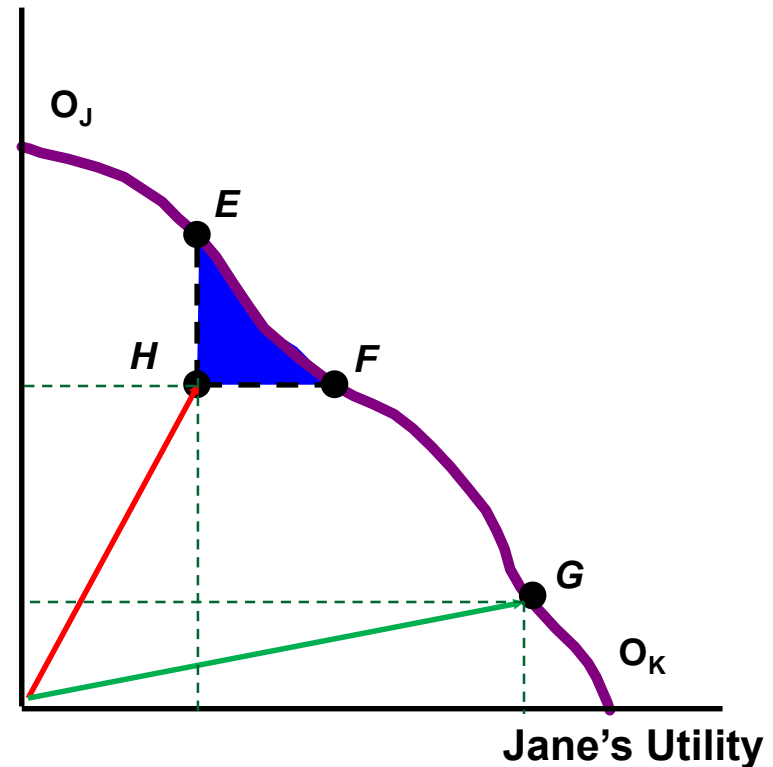
The Utility Possibilities Frontier and the Social Welfare Function (SWF)

- Welfare theory addresses the equity-efficiency decisions using the concepts of the **Utility Possibilities Frontier (UPF)** and **Social Welfare Function (SWF)**.
- Society can reach a **whole series of Pareto Efficient utility combinations among individuals deriving from different initial allocations** of available resources.
- These utility combinations are represented on the **Utility Possibilities Frontier (UPF)** which describes the maximum amount of utility that can be allocated to different individuals: i.e. **highest available level of utility (or welfare) attainable by one individual (or group of individuals) given the levels of utility attainable by others and the initial set of available resources**.
- Along the UPF it is not possible to increase the utility of an individual, without reducing the utility of another. The shape of the UPF derives from the assumption of diminishing marginal utility.

The Utility Possibilities Frontier and the trade off between efficiency and equity

- ❑ The shape of the UPF depends on the assumption of diminishing marginal utility.
- ❑ Consider a society consisting of only 2 individuals: Jane and Sam
- ❑ Consider the utility distributions **E, G and H**.
- ❑ Which distribution is more equitable?
 - **H** may be **more equitable** than E and G because the distribution of utilities between Jane and Sam is more equal, **but it is not Pareto efficient**: we can have Pareto improvements (increasing the utility of both individuals, or the utility of one of them, without reducing the utility of the other) in the blue shaded area.
 - **E and G** are both **Pareto efficient**, but the distribution of utility is very different.
 - How do we choose between them? We use **Social Welfare Functions** represented by **Social Indifference Curves**

Sam's Utility



The Social Welfare Function

- Along the UPF all points are Pareto efficient. 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 the possible combinations of the utilities of different individuals or groups. This function includes value judgments about the relative importance of the individuals or group of individuals that comprise society.
- The **Social Welfare Function (SWF)** combines the utility functions of all individuals into an overall social utility function: in the case of a society amde up by only two individuals, Sam and Jane:

$$W = F(U_{\text{jane}}, U_{\text{sam}})$$

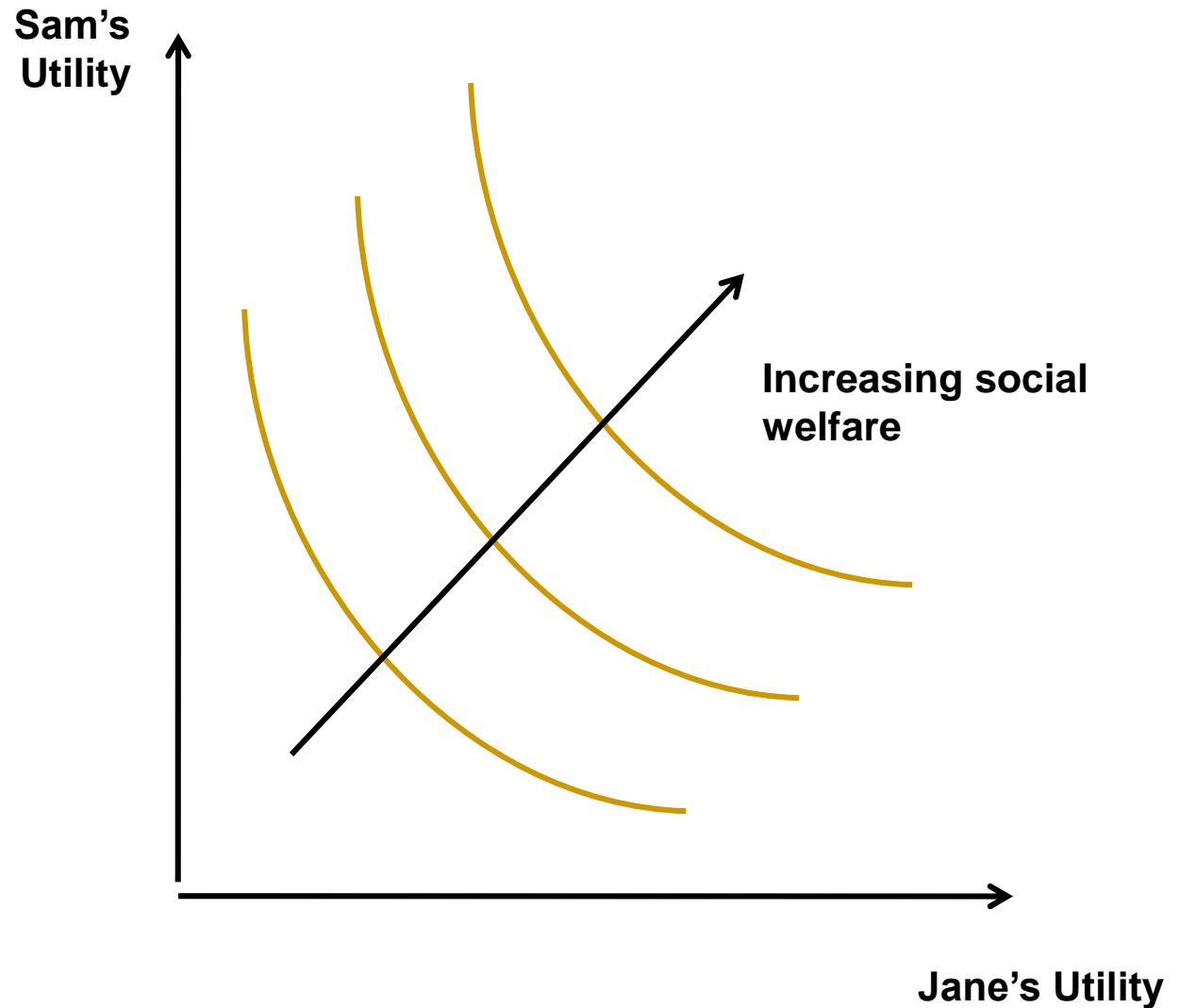
How do we derive and represent a Social Welfare Function?

- Using the same approach of the **individual consumer choice model**.
- Assumptions:
 - **Utility comparisons are meaningful** because utility is cardinal and measurable.
 - It is **possible to aggregate individuals' utilities** in a Social Welfare Function represented by Social Indifference Curves.
- The **Social Welfare Function** represents the level of social welfare corresponding to a particular set of utility levels attained by different individuals.
- **Social Indifference Curves** represent the combinations of utilities of different individuals that yield the same level of Social Welfare to society. **Along each Social Indifference Curve the combinations of individuals' utilities give the same level of welfare for society.**
- **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.**

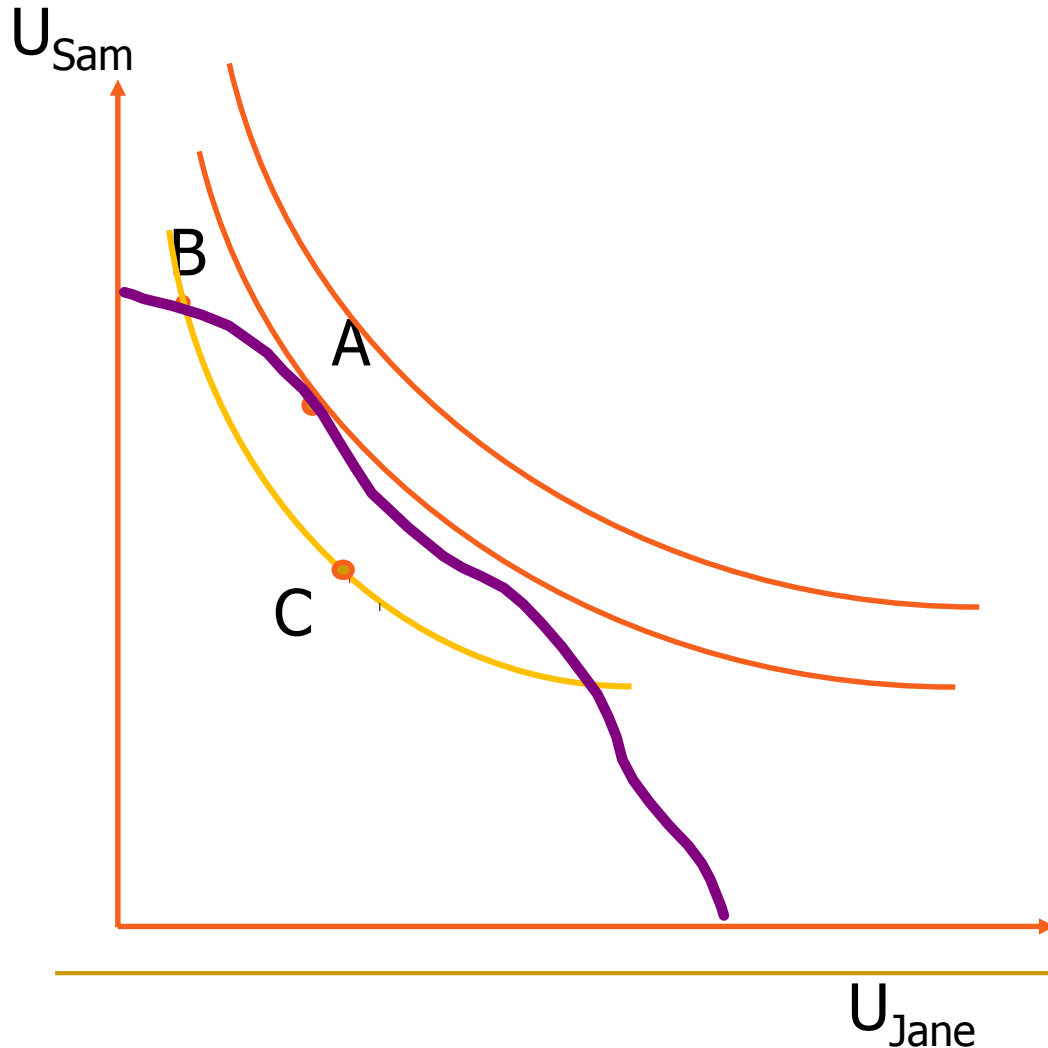
Social Indifference curves

Social Indifference curves (similar to individual indifference curves) summarise all the **allocations of utilities across individuals which result in 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 combinations? 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. In this case society considers Jane well being more important than Sam's well being. Sam can be compensated for from the loss of utility with lump sum transfers.
- **C** would be more equitable than **A**, but it is not efficient since it is on a lower Social Indifference Curve than **A** and **B**

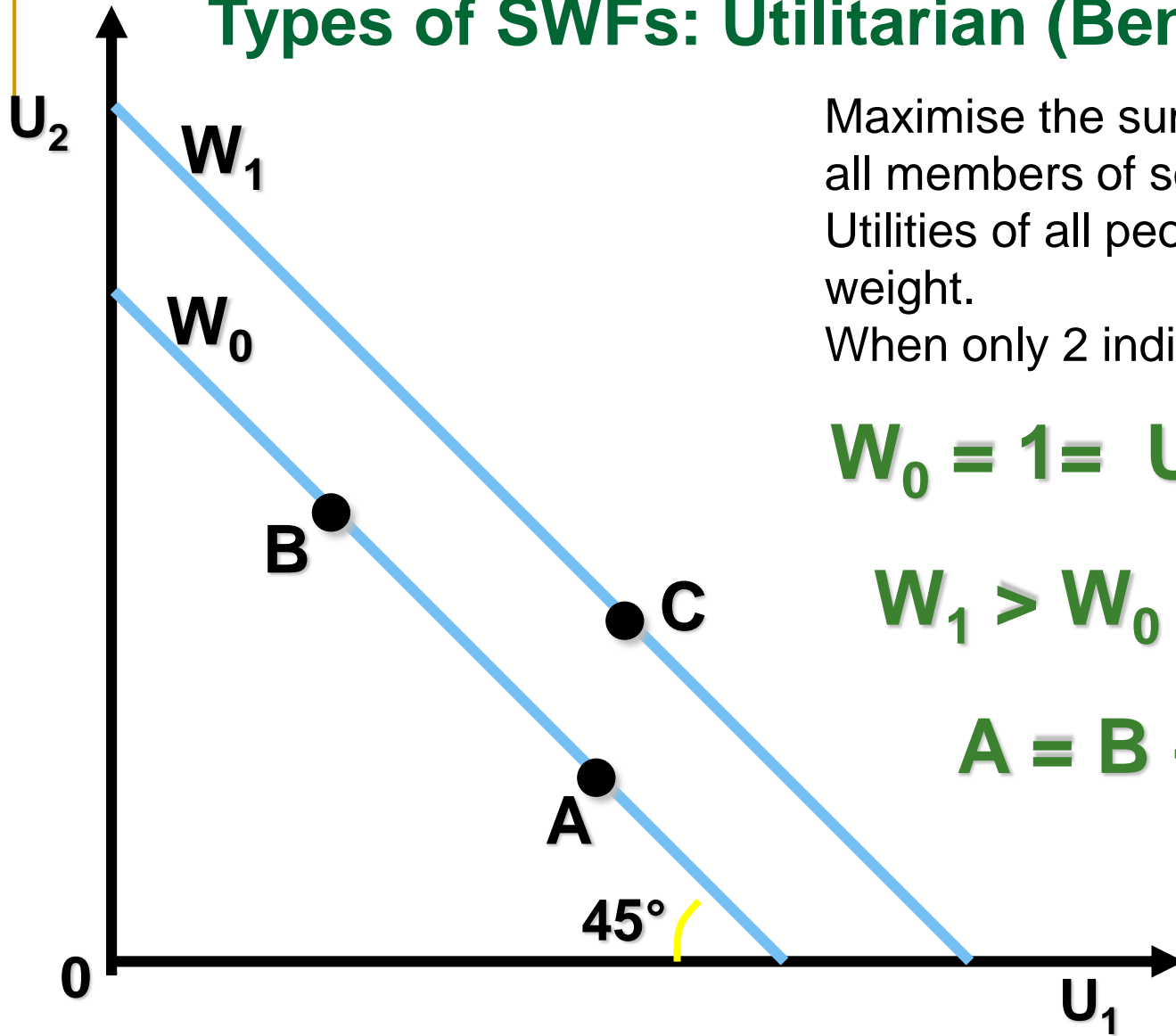
The efficiency-equity trade off and the SWF

- 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 chosen, 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 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 extreme views of Equity...and shapes of Social Indifference Curves/1

- Various social preferences may be represented by social indifference curves taking on various shapes. Two extremes:
- **Utilitarian welfare function (Bentham)**
 - The welfare function is the sum of the utility of each individual.
 - All individuals are treated the same (they are given equal weight) and receive the same level of utility, whatever their initial level:
$$SWF=Ua+Ub+Uc+...+Un$$
 - **Society is indifferent between who is getting more** (the rich or the poor): one extra unit of utility for a poor person has the same value as an extra unit of utility for a rich person, as long as the person values at least as much as the other the additional unit of resources.
 - In this case, **maximizing the social welfare means maximizing the total welfare (income) of the people in the society, without regard to how incomes are distributed in society.** Only the total level of utility is relevant, whatever the distribution across individuals.

Types of SWFs: Utilitarian (Bentham)



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

When only 2 individuals:

$$W_0 = 1 = U_1 + U_2$$

$$W_1 > W_0$$

$$A = B < C$$

Two extreme views of Equity....and shapes of Social Indifference Curves/2

Rawlsian

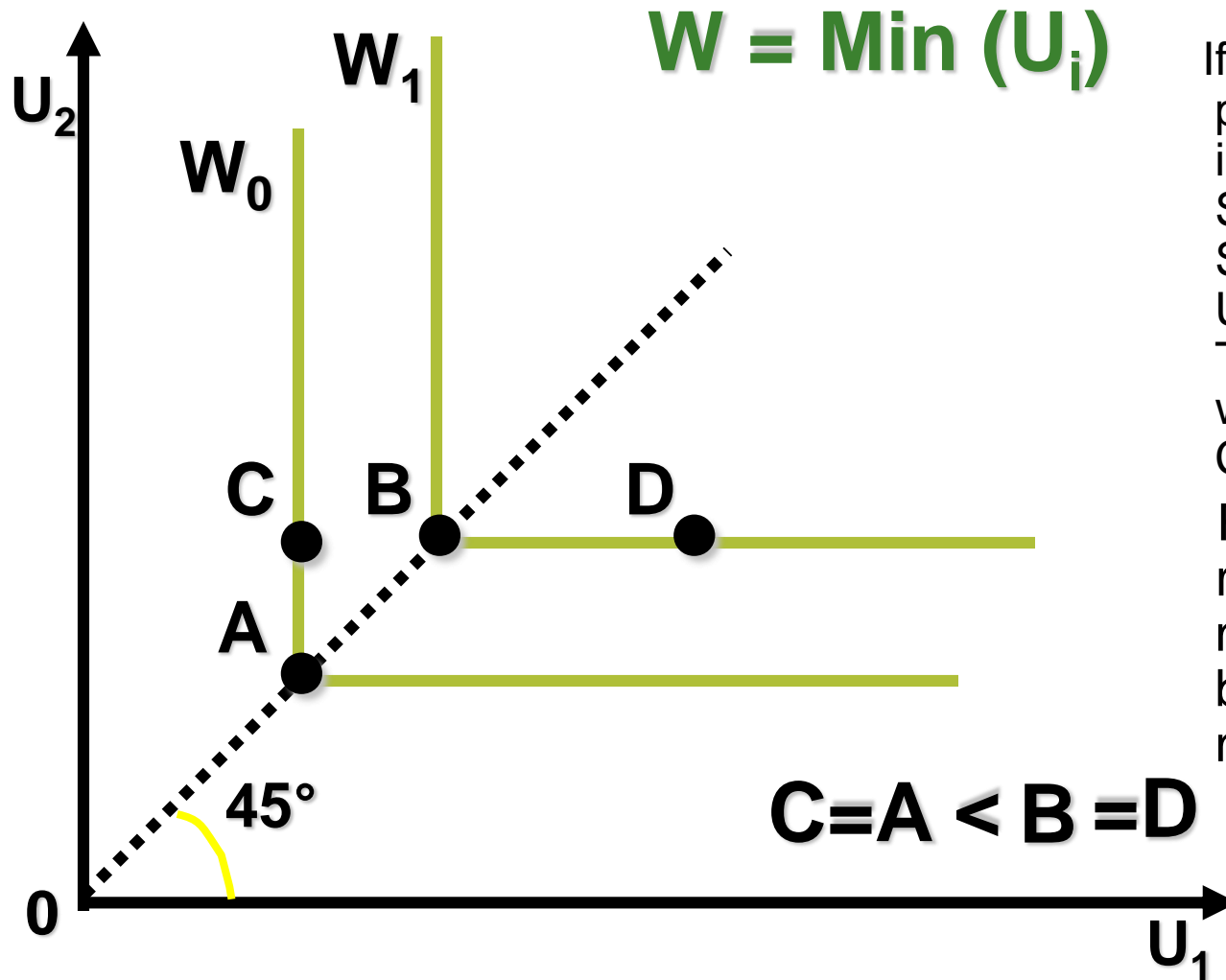
Maximize the utility of the least-well-off person:

$$\text{SWF} = \min (U_a, U_b, \dots, U_n)$$

Social welfare is maximized when the well-being of the worst off person in society is maximized

Improvements in the utilities of the richest do not improve social welfare

Social welfare functions: Rawlsian



If U_2 increases from point A to C, there is no improvement of the SWF does not. The SWF depends only on U_1 (worst off individual). To improve social welfare have to go from C to B. No trade-off.

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

Example

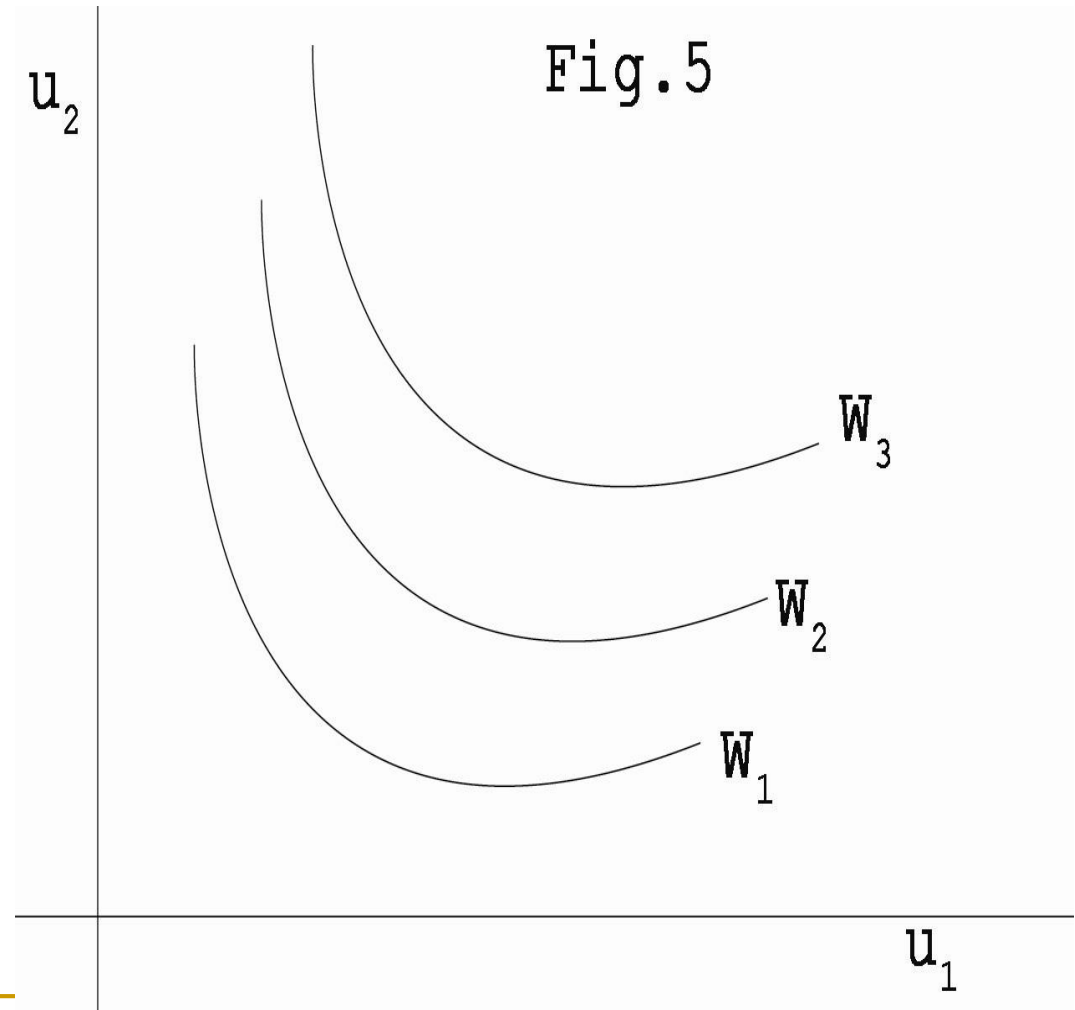
There is a society where all individuals have the same preferences and an income of €40,000, except for Jim who has an income of € 1 million and Jane with an income of 39,999.

To increase equality in income distribution, the government introduces a fiscal policy that taxes Jim for €960,000 and gives Jane €1

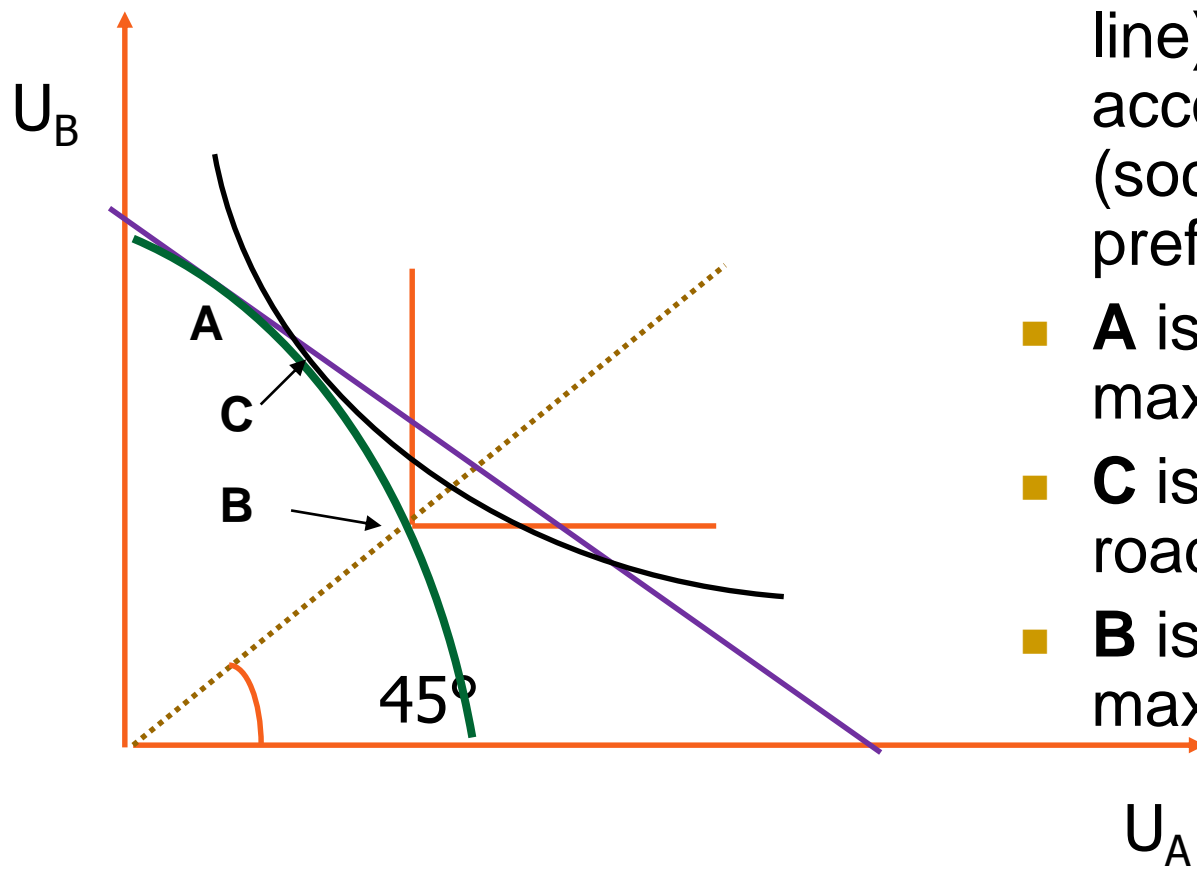
- In a Utilitarian SWF this policy would reduce social welfare because the fall in Jim's utility will be higher than the rise in Jane's utility
- In a Rawlsian SWF this policy would increase social welfare because the utility of Jane (the worst off in this society) has improved.

Types of SWFs: intermediate 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 it is compensated by a much larger increase in the utility of the rich.



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



- Given the UPF (green line): different choices according to SWF (social preferences/values)
- **A** is a utilitarian maximum
- **C** is a middle of the road maximum
- **B** is a Rawlsian maximum

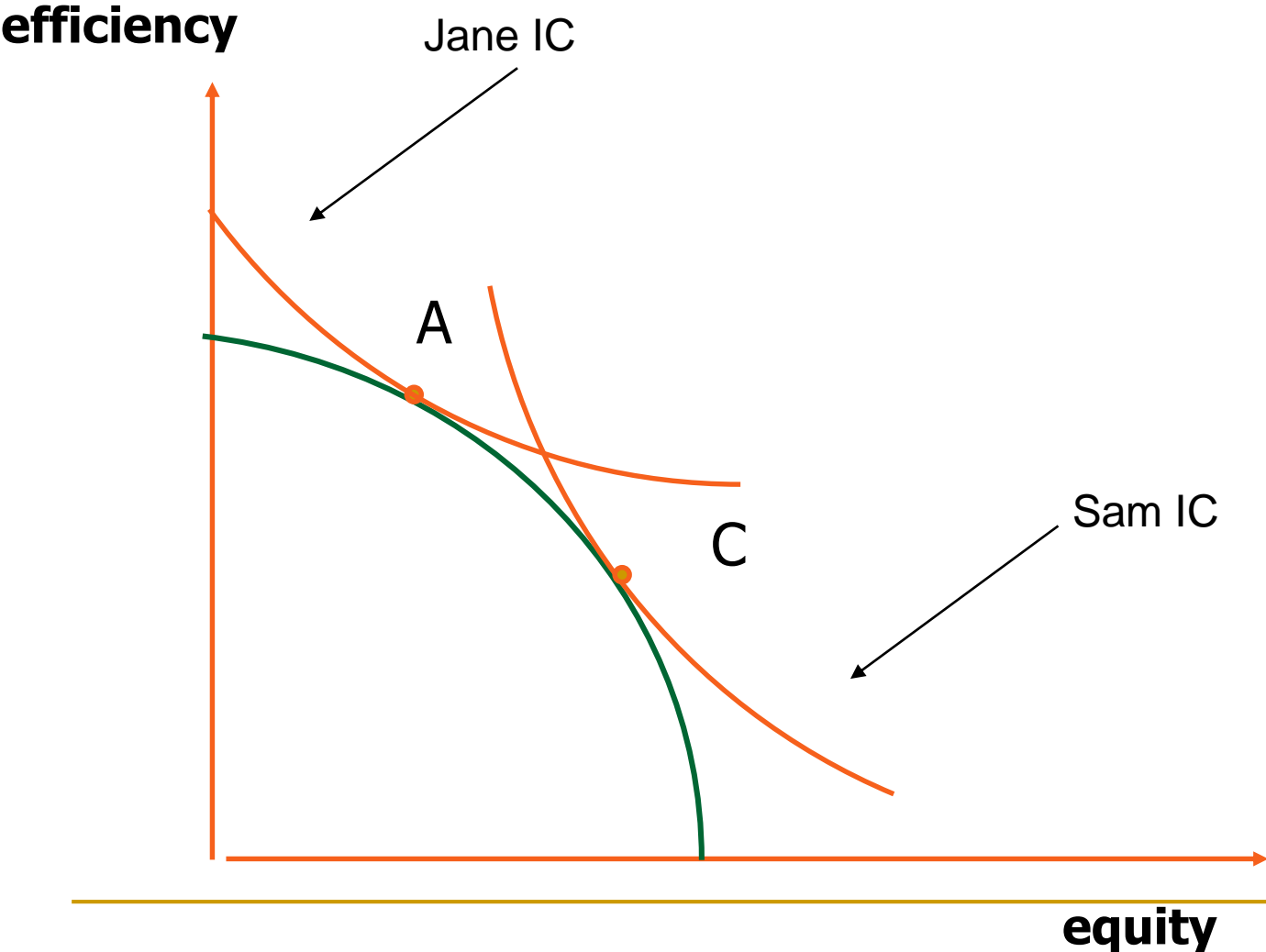
Main problems with SWF approach

- **Representation of individual preferences and definition of the aggregation rule (**Arrow impossibility theorem**):** Given ordinal & non-comparable individual utility functions, no SWF exists (except in dictatorship)
- **Measurability of utility and aggregation: there is no way to aggregate preferences.** Who's preferences does the SWF represent? Dictator? Median voter? Lobbyist?
- **Hypothesis on the possibility to make interpersonal comparisons**

Efficiency and distribution trade offs: analysing social choices

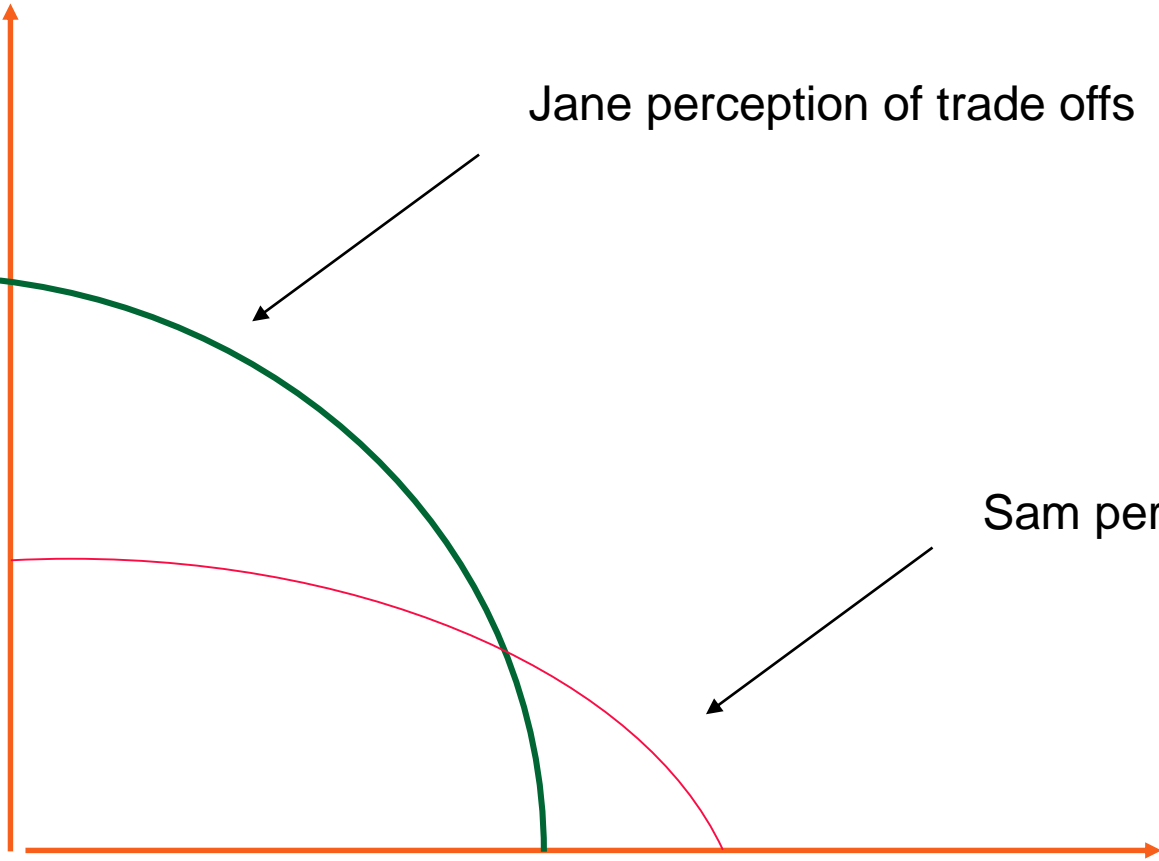
- There is **no objective way to define what is equitable**, because its definition depends on social values. For example there are different concepts of equity: **equality of opportunities (initial conditions, rules) vs equality of outcomes**
 - In addition there is **disagreement about the nature of 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**
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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** (focus on initial conditions, emphasis for ex. educational policies)
- **Equity of results** (emphasis for ex. on redistributive policies, e.g. social assistance to the poor)

Examples:

1. Should we give unemployment benefits to all those 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?
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The political process

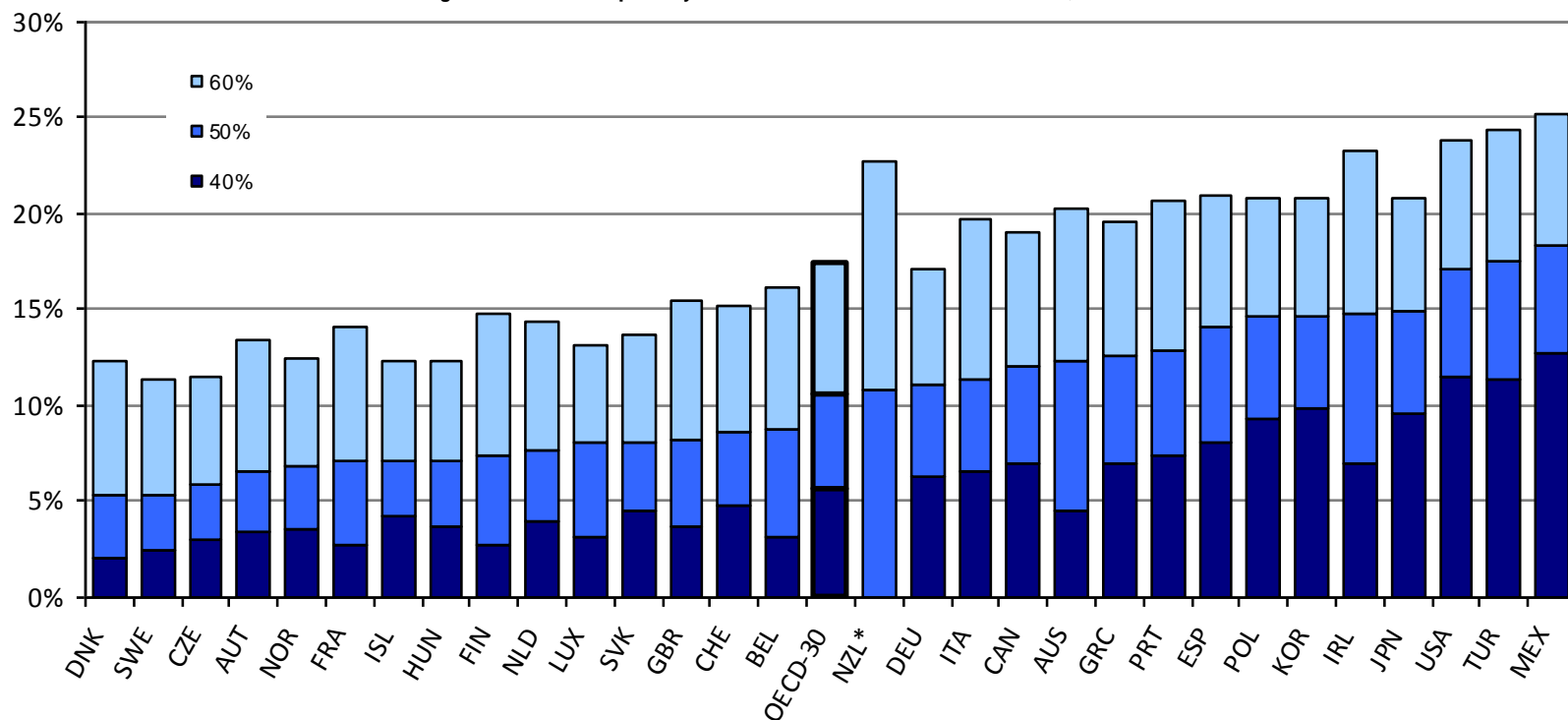
- How decisions are taken in democracy is also important: how are different values and perceptions of trade offs considered?
 - **Arrow Impossibility Theorem: there is no general way to aggregate preferences** without running into some kind of irrationality or unfairness. Arrow was able to prove mathematically 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)
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Measuring distributional effects (equity)

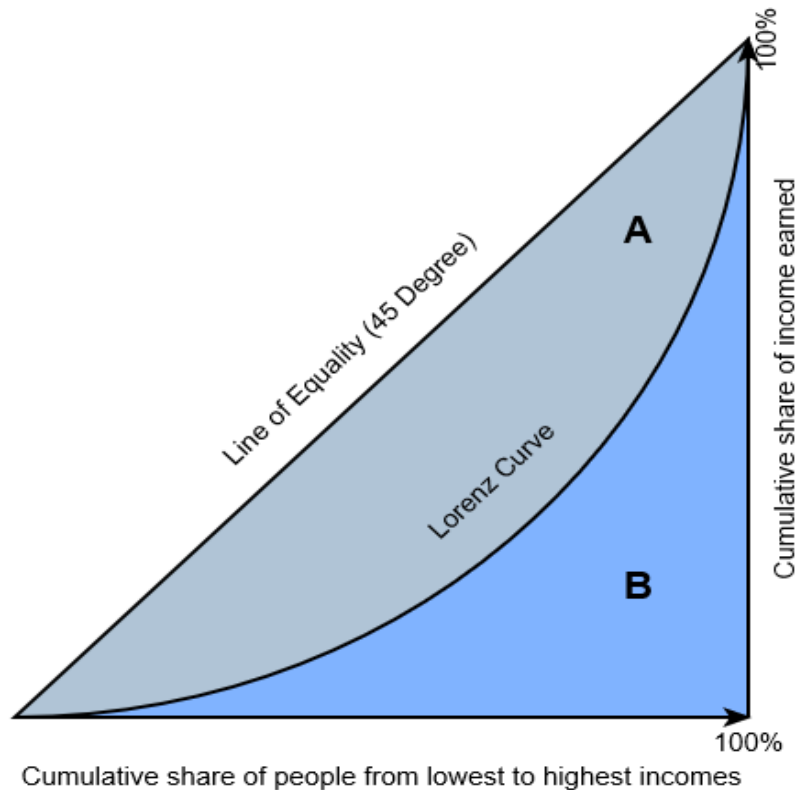
- Difficult because different groups of individuals may be affected in different ways by a policy
 - Usually the equity impact of a programme is considered on some **measure of inequality**. The most used are:
 - **Poverty rate** (relative poverty): share of a population whose income is below a poverty threshold (how do we define the threshold?). **Poverty gap**: it measures how far below the poverty threshold poor people are.
 - **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** (most used). Comparison of cumulative proportions of the population against cumulative proportions of their income. It ranges between 0 (max equality) and 1 (max inequality). Allows direct comparison of two populations' income distribution, regardless of their sizes. In addition, very different income distributions can present the same Gini coefficient.
 - **Deciles' dispersion rates**. S80/S20: the ratio of the average income of the 20% richest to the 20% poorest; P90/P10: ratio of the income of the ninth decile (i.e. the 10% of people with highest income) to that of the first decile.
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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 and Gini Index



The Gini Index is computed as the ratio of the area between the Lorenz curve and the equality line (area A) to the area beneath the 45-degree equality line (A+B).

In the figure the $GI = \frac{A}{A+B} = 2A$ given that $(A+B) = 1/2$
A higher Gini coefficient represents a more unequal distribution

GI = 0 Max equality

GI = 1 Max inequality

A country in which **every resident has the same income** would have an **income Gini coefficient of 0**.

A country in which **one resident earned all the income, while everyone else earned nothing**, would have an **income Gini coefficient of 1**

Gini Index (GI)

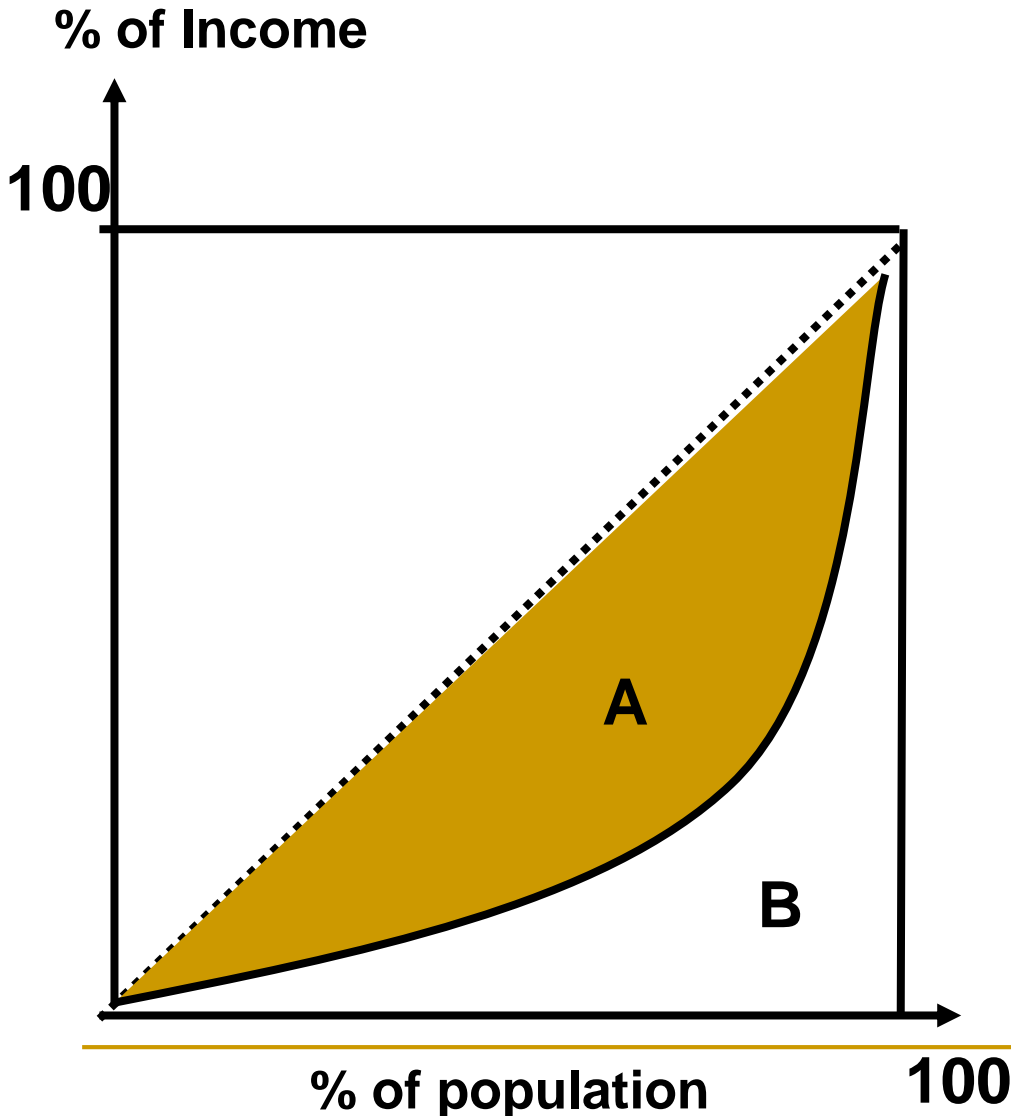
It is computed as the ratio of the area between the two curves (area A: between Lorenz curve and 45-degree line) to the area beneath the 45-degree line (A+B).

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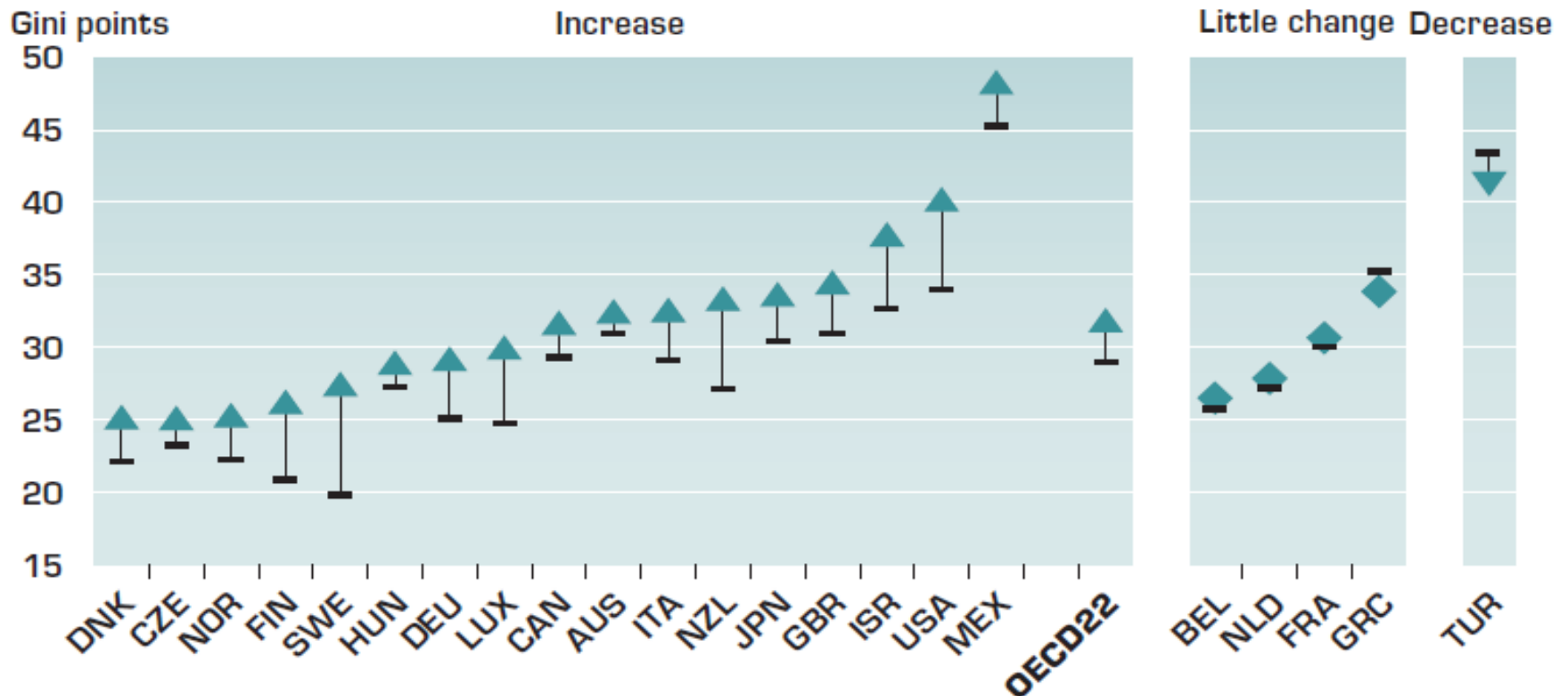
A country in which **one resident earned all the income, while everyone else earned nothing**, would have an **income Gini coefficient of 1**



Data: Income inequality has increased in most OECD countries since the mid-1980s.

Gini measure of income inequality, mid-1980s and 2013

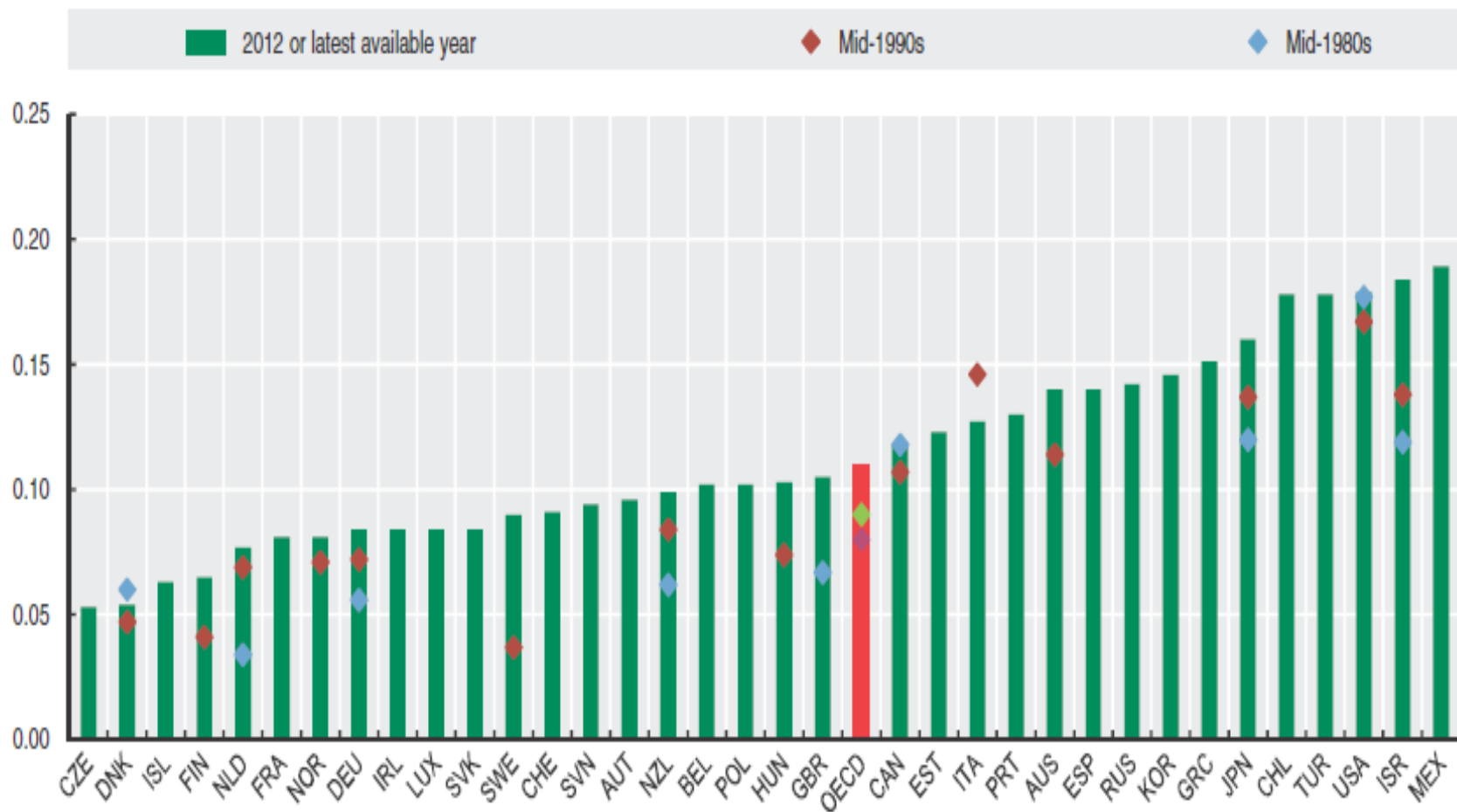
— 1985 ◆ ▲ ▼ 2013 or latest year available



Source: OECD (2015), *In It Together: Why Less Inequality Benefits All*, <http://dx.doi.org/10.1787/888933207711>.

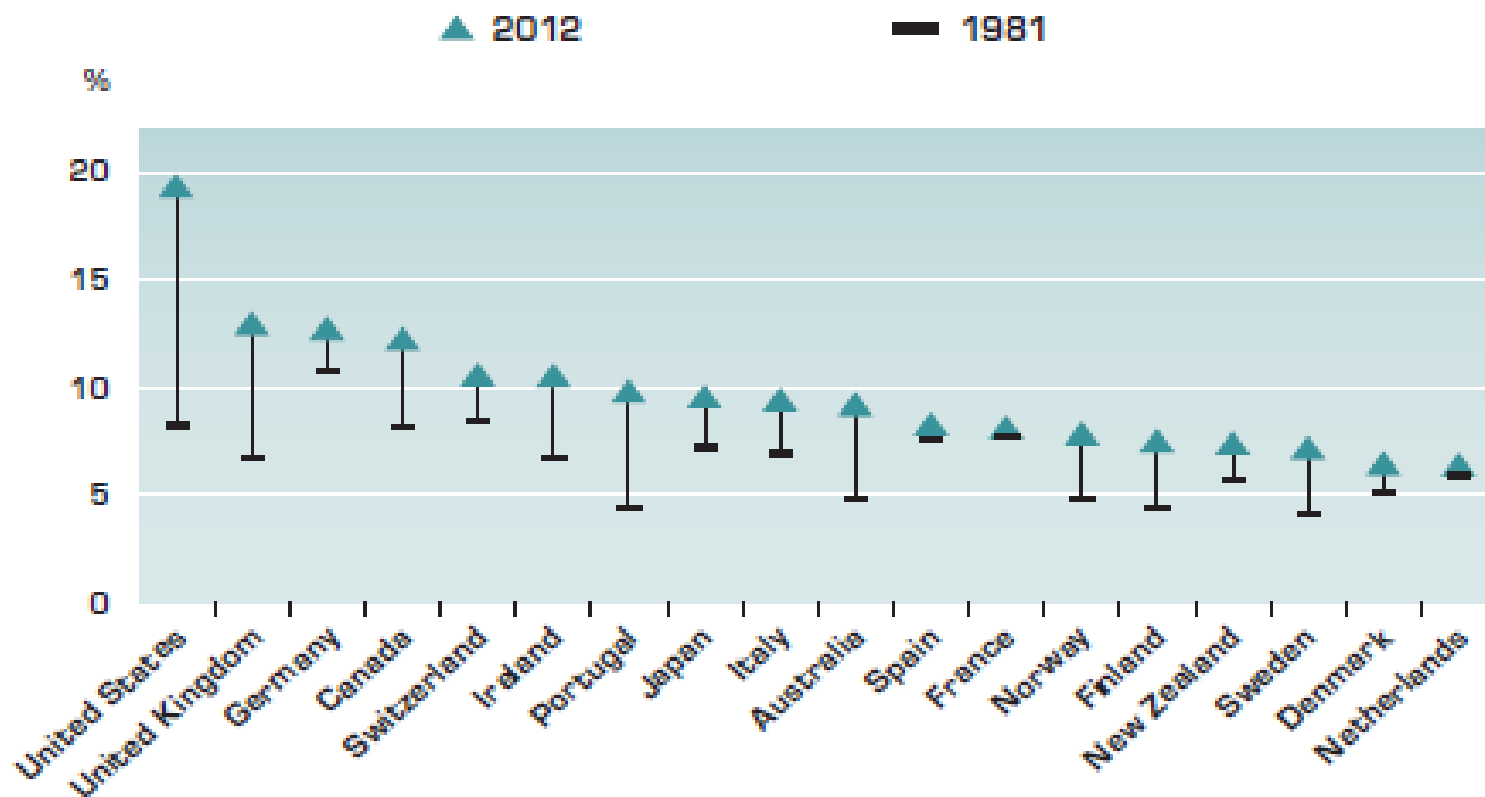
Trends in poverty rates

Relative poverty rates in mid-1980s, mid-1990s and 2012 or latest available year




Data: Top earners have increased their share of total earnings in most OECD countries since the 1980s.

Share of top 1% incomes in total pre-tax income,
1981-2012 (or latest year available)



Source: OECD (2014), "Focus on Top Incomes and Taxation in OECD Countries: Was the crisis a game changer?", <http://dx.doi.org/10.1787/888932965953>.

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 intervention 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).