Public Economics

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Office Hours: Tuesday afternoon (15h30 – 16h50) – or simply e-mail me

NOVA SCHOOL OF BUSINESS & ECONOMICS

Information

Moodle Password: publicecon*

Classes:

- P301A: Tuesday 14h-15h30 at D010
- P302A: Tuesday 17h-18h20 at B128

Feel free to come to the one that best suits you

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Information - Grading

- Midterm – 25%

  4/04 at 14h

  Mandatory

- Final Exam – 50%

  4/06 at 14h30

  Minimum grade: 8.0

- 3 Assignments – 25%

  2 groups assignments and 1 individual assignment

  Important: You have until Friday (14/02) to submit group composition

2- Redistribution and Fairness

2.1) Utility-based fairness criteria (Ch 2)

Fairness Criteria: From surplus to welfare

Key concepts:

Total Social surplus: The sum of surplus received by consumers and producers in a market

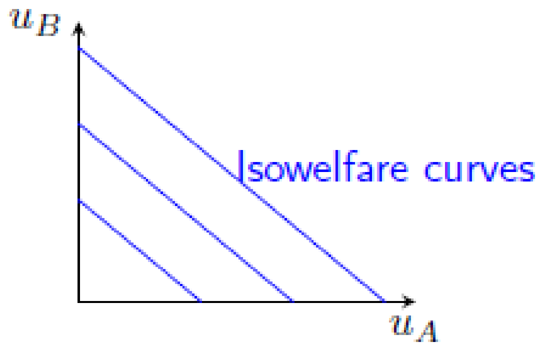
Social Welfare: The level of well-being in society

Social Welfare function (SWF): A function that combines the utility functions of all individuals into an overall social utility function - **considers not only total surplus, but also how it is distributed**

Utility-based Fairness Criteria - SWF

1) Utilitarian SWF: Society's goal is to maximize the sum of individual utilities (perfect substitutes)

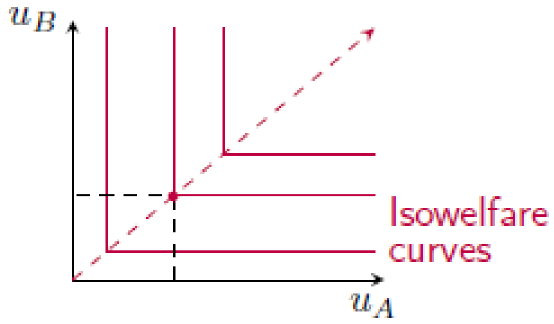
$$\text{SWF} = U_1 + U_2 + \dots + U_N = \sum_{i=1}^{N} U_i$$



2) Rawlsian SWF: Society's goal is to maximize the well-being of its worst-off member (perfect complements)

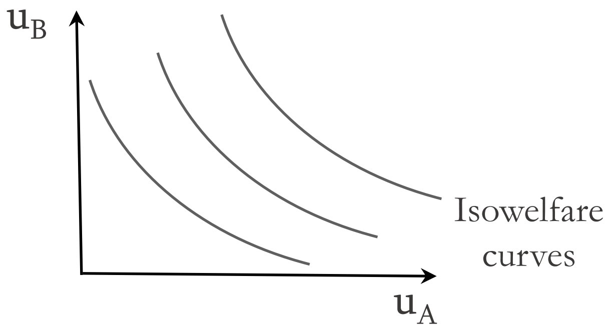
$$\text{SWF} = \min(\text{U}_1, \text{U}_2, \dots, \text{U}_\text{N})$$

With two agents: $\text{SWF} = \min(\alpha \text{U}_1, \beta \text{U}_2)$ // Kink at: $\alpha \text{U}_1 = \beta \text{U}_2$



3) Cobb-Douglas SWF: Neither perfect substitutes, nor perfect complements – in between

$$\text{SWF} = (U_1)^{\alpha_1} * (U_2)^{\alpha_2} * \dots * (U_N)^{\alpha_N} = \prod_{i=1}^{N} (U_i)^{\alpha_i}$$



PS 2: Utility-based Fairness Criteria

Ex.1) Consider the Utilitarian social welfare function and the Rawlsian social welfare function.

a) Which one is more consistent with a government that redistributes from rich to poor? Which is more consistent with a government that does not do any redistribution from rich to poor?

Intuitively, Rawlsian SWF is more consistent with redistribution

b) Think about your answer to 1a). Show that government redistribution from rich to poor can still be consistent with either of the two social welfare functions.

Utilitarian SWF is also consistent with redistribution: Diminishing Marginal Utility!

PS 2: Utility-based Fairness Criteria

Ex.2) The country of Adventureland has two citizens, Bill and Ted. Bill has a private legal business. He earns 50 per hour. At a tax rate of 0%, Bill works 20 hours. At a 25% tax rate he works only 16 hours, and at a 40% tax rate he works only 8 hours per week. Ted works a manufacturing job. He works 20 hours per week and earns €6 per hour, regardless of the tax rate. The government is considering imposing an income tax of either 25% or 40% on Bill and using the revenues to make transfer payments to Ted. The accompanying table summarizes the three possible policies.

Does either tax policy raise social welfare? Is either of the policies obviously less than optimal? Explain your answers.

Effects of Redistributive Policies in Adventureland			
	0%	25%	40%
Bill's Pre-Tax Income	1,000 €	800 €	400 €
Bill's Taxes	0 €	200 €	160 €
Bill's Net Income	1,000 €	600 €	240 €
Ted's Pre-Tax Income	120 €	120 €	120 €
Ted's Transfer Payment	0 €	200 €	160 €
Ted's Net Income	120 €	320 €	280 €

PS 2: Utility-based Fairness Criteria

Ex.3) Now, suppose that Bill and Ted have the same utility function $\mathrm{U(Y)} = (Y)^{1/2}$ where Y is consumption (which is equal to net income).

a) Rank the three tax policies discussed in the previous question for a utilitarian social welfare function. Rank the three for a Rawlsian social welfare function.

b) How would your answer change if the utility function was instead $\mathrm{U(Y)} = (Y)^{1/5}$?

Effects of Redistributive Policies in Adventureland			
	0%	25%	40%
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PS 2: Utility-based Fairness Criteria

Ex.3) c) Suppose that Bill and Ted instead have different utility functions:

$$U_{Bill}(\mathrm{Y}) = 0.25 * (Y)^{1/2}, U_{Ted}(\mathrm{Y}) = (Y)^{1/2}$$

(This might happen, for example, because Bill has significant disabilities and therefore needs more income to get the same level of utility).

How would a Rawlsian rank the three tax policies now?

Effects of Redistributive Policies in Adventureland			
	0%	25%	40%
Bill's Pre-Tax Income	1,000 €	800 €	400 €
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Utility-based Fairness Criteria - UPF

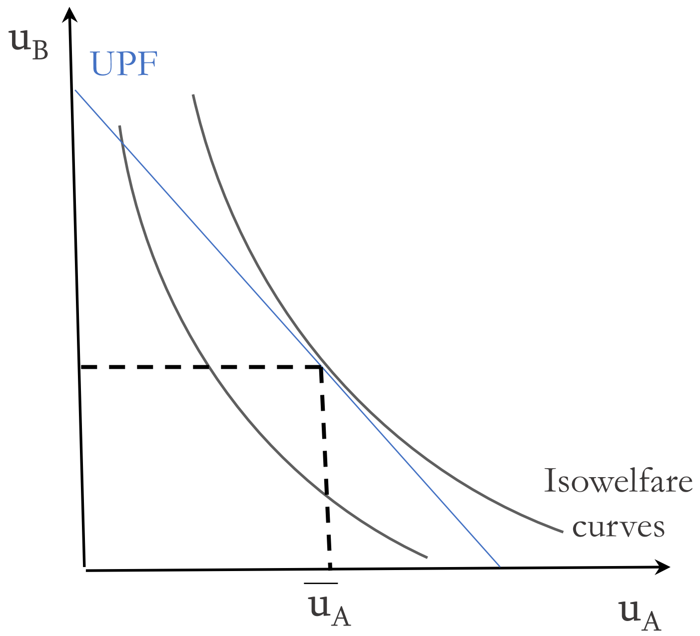
Utility Possibility Frontier (UPF):

- The maximum amount of one agent's utility that can be achieved given a fixed level of utility achieved by all others

- **Efficient** and **feasible** allocations

Government's maximization problem:

$$\begin{array}{cc} max & SWF \\ s.t. & UPF \end{array}$$



Ex.4) Is any point along the UPF equally desirable from a social point of view?

No, although they are all efficient.
Points on the same isowelfare curve are equally desirable!

Previous midterms – Fall 22

II (4 points)

Consider an economy with two consumers with utility functions $U_1 = min\{2x_1, y_1\}$ and $U_2 = \sqrt{8x_2 . y_2}$. Assume there is 1 unit of x and 2 units of y to distribute among the agents.

a. (2.25 points) Using an Edgeworth box, find the set of Pareto efficient points and find the utility possibility frontier.

Efficient allocations will be such that $2x_1=y_1$ and $2x_2=y_2$
Then, for all efficient allocations, $U_1=2x_1$ and $U_2 = 4x_2$. Therefore, $U_2=4(1- U_1/2)$ and $U_2 = 4-2U_1$.

Grading: 1.25 points for the identification, justification and description of efficient allocations; 1 point for the calculation of the UPF.

b. (1.75 points) Find the Rawlsian choice for this economy. Will the resulting allocation be envy-free?

We want to maximize min $\{U_1,U_2\}$ s.t. $U_2 = 4-2U_1$
We have $U_1=U_2$ and therefore $U_1=U_2=4/3$.
The resulting allocation is $x_1=2/3$, $y_1=4/3$, $x_2=1/3$, $y_2=2/3$ and this is not envy-free: agent 2 will envy agent 1 (and in fact the allocation violates no-domination - and preferences are monotonic).

Grading: 0.5 for the formulation, 0.5 for the solution, 0.5 for the analysis of no-envy and 0.25 for the conclusion.

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