

Lecture 1: Government in a market economy

Economics 336/337

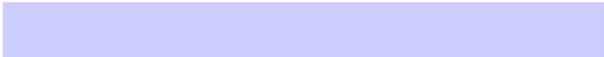
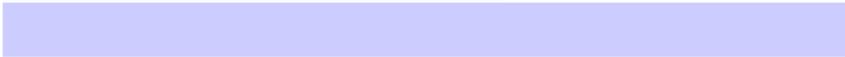
Key questions

Key questions in public economics:

- ① When should government intervene in a market economy?
- ② How should government intervene?
- ③ How do we evaluate the effects of government policy?
- ④ What can go wrong with government policy?

Note this course is about *positive analysis* and *normative analysis* of government.

When should government intervene?

- efficiency:
 - Under some conditions, competitive market equilibrium is Pareto efficient – avoids waste of resources.
 - Role for corrective policy intervention in the case of **market failure**:
 - 
 - 
 - 
 - 
- equity:
 - government should redistribute resources to ensure fairness of allocation among people
 - competitive equilibrium may be efficient – but inequitable

How should government intervene

Types of government policies:

- taxes/subsidies for private transactions
- regulations
 - [redacted]
 - [redacted]
- public provision: [redacted]

Exercise

Give examples of all these policy types in the fields of:

- urban transportation
- welfare/income support
- environmental policy

How do we evaluate government policy?

- direct versus indirect effects
 - indirect effects arise as people **change behaviour** in response to policy
 - example: [REDACTED]
- quantities and prices (**incidence analysis**)
 - policies that change supply/demand may also change equilibrium prices
 - price changes influence efficiency/equity effects of policy
 - example: [REDACTED]
- measuring welfare changes
 - willingness to pay for a price change
 - comparing costs and benefits of policy accruing to different groups of people
 - example: [REDACTED]

What can go wrong?

- government failure versus market failure
- political economy of government policy:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

Theoretical tools

Key formal ideas:

- 1 First Welfare Theorem: When should government intervene?
- 2 Second Welfare Theorem: How should government intervene?
- 3 Equity–efficiency tradeoff: What are the costs of intervention?

Standard view: avoid intervening in (“distorting”) markets when they are efficient, but act when *market failures* are identified.

Smith’s Invisible Hand: a self-interested economic actor

“intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was not part of it.”

A contentious idea...

First Welfare Theorem

A formal statement of Smith's idea for an *exchange economy*.

Two consumers $i = 1, 2$ consume two goods (x, y) and have utility functions $u_i(x_i, y_i)$, $i = 1, 2$. Assume that marginal utilities are positive.

Consumers' *endowment* (supply) is (a_i, b_i) .

An allocation (x_1, x_2, y_1, y_2) is *feasible* if

$$x_1 + x_2 \leq a_1 + a_2$$

$$y_1 + y_2 \leq b_1 + b_2$$

First Welfare Theorem

A *competitive equilibrium* is an allocation and prices (p, q) such that

- 1 demand equals supply, and
- 2 consumers maximize utility: for any other bundle (x'_i, y'_i) , if $u_i(x'_i, y'_i) > u_i(x_i, y_i)$ then

$$px'_i + qy'_i > pa_i + qb_i$$

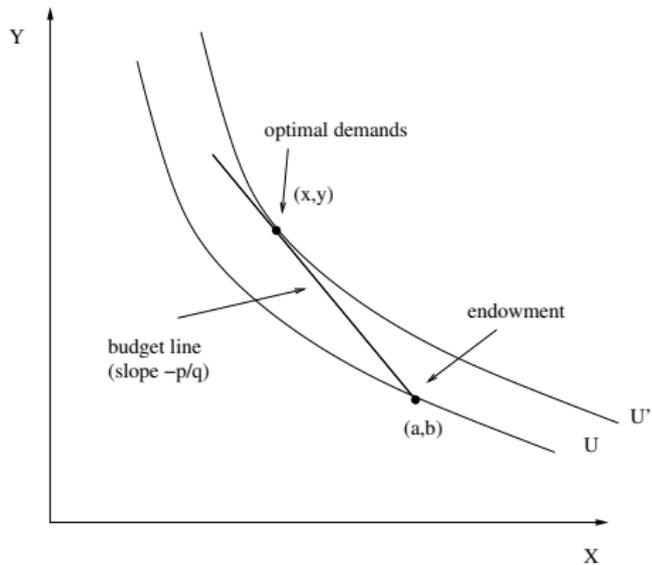


Figure: Utility maximization

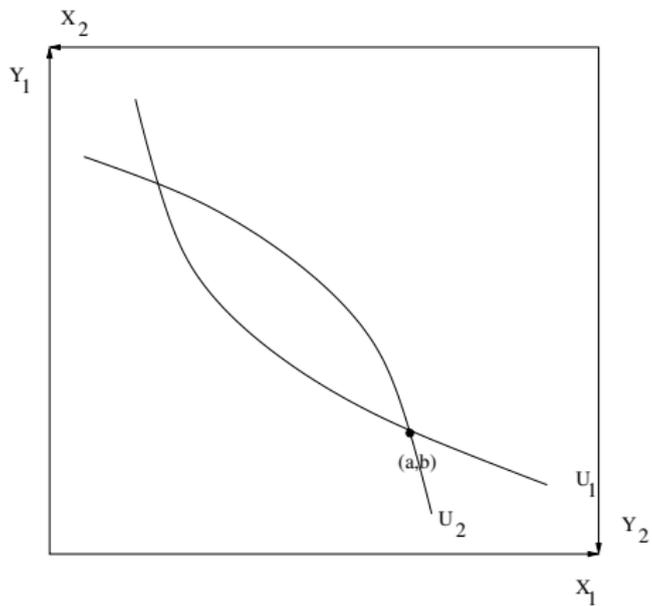


Figure: The Edgeworth box

Pareto efficiency

What do we mean by “resources should not be wasted”?

One formalization:

An allocation (x, y) is *Pareto efficient* if there is no other feasible allocation that all consumers prefer: there does not exist (x', y') such that

- $u_i(x'_i, y'_i) > u_i(x_i, y_i)$ for all i , and
-

$$x'_1 + x'_2 \leq a_1 + a_2$$

$$y'_1 + y'_2 \leq b_1 + b_2$$

In the Edgeworth box, which allocations are Pareto efficient?

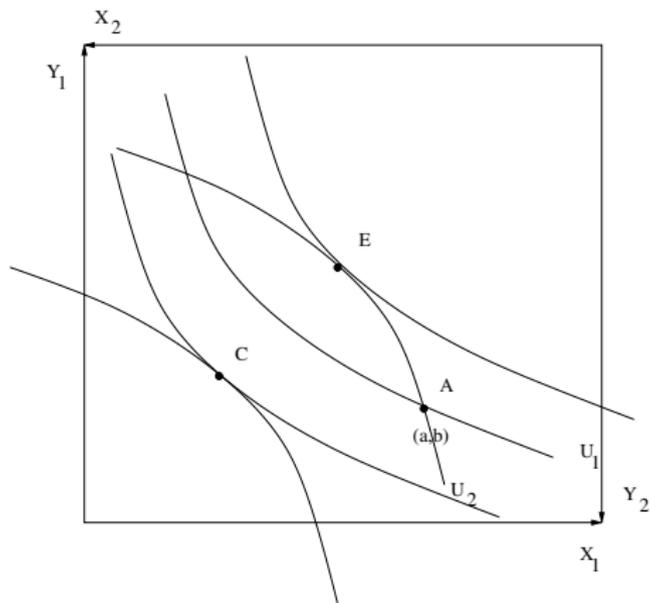


Figure: Pareto efficiency in the Edgeworth box

First Welfare Theorem

Theorem: Every competitive equilibrium of an exchange economy is Pareto efficient.

Graphical “proof”: If indifference curves are smooth then equilibrium must be at point of tangency with budget line where

$$MRS_i = \frac{\partial u_i / \partial x_i}{\partial u_i / \partial y_i} = \frac{p}{q}$$

But then $MRS_1 = MRS_2$: indifference curves are tangent to each other.

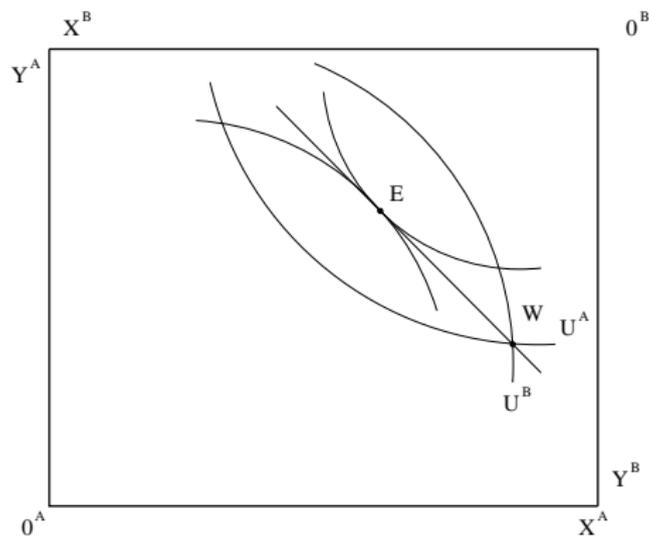


Figure: Efficiency of competitive equilibrium in an exchange economy

More on FWT

Extensions to production economies:

- 1 Product-mix efficiency: If some commodity is not being produced and consumers willing to pay its cost, profit-maximizing firms will provide it (price equals marginal cost).
- 2 Production efficiency: If firms are not producing at minimum cost then competition will drive them out.

Second Welfare Theorem

Problems with Pareto efficiency:

- many allocations are efficient
- many efficient allocations are unfair

What can government do to ensure equity *and* efficiency?

Second Welfare Theorem. Under some conditions, every Pareto efficient allocation can be achieved by a competitive, market economy, as long as government can make lump-sum transfers of income or resources among individuals.

Prescription: just make income transfers to the needy and let the market work. Government should not e.g. tax cars, supply public housing, have affirmative action, provide free education.

SWT: An example

In an exchange economy, Boris is endowed with 14 hours of labour and Natasha is endowed with 2 kg of rice each day. The competitive equilibrium price of labour is 40 grams of rice per hour, and Boris supplies 10 hours per day to Natasha in exchange for 400 grams of rice.

Government could increase equity by taxing 1 kg of rice per day from Natasha and transferring it to Boris. Although labour supplied by Boris may fall, and the price of labour may rise, the new equilibrium is still Pareto efficient.

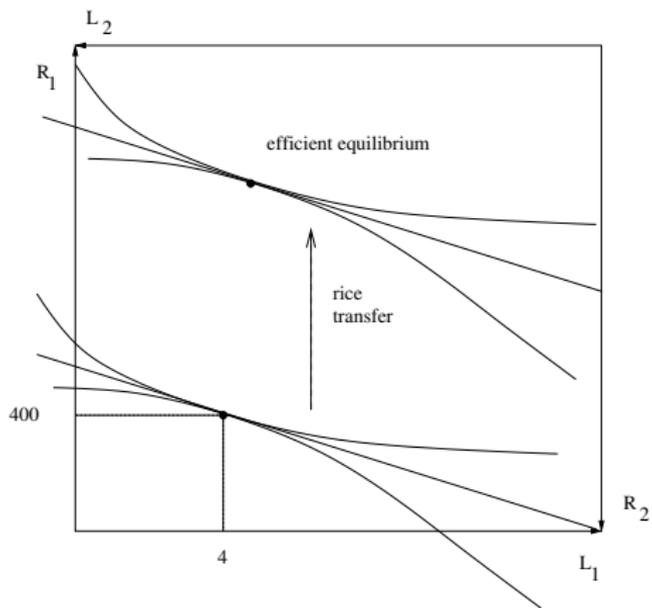


Figure: Effect of a lump-sum transfer

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Alternatively, consider a labour subsidy of 40 grams of rice *per hour worked*, which is still financed by a lump-sum tax on Natasha's rice endowment. Is the new equilibrium efficient? Why not?

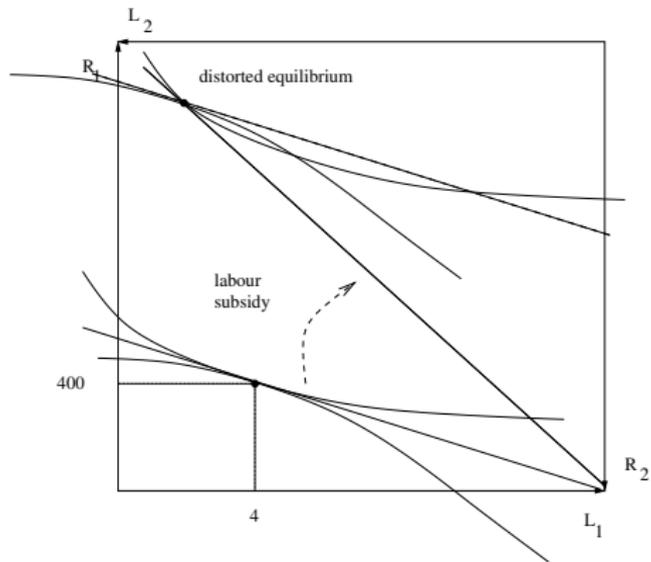


Figure: Effect of a distortionary subsidy

Equity–efficiency tradeoff

In practice, government redistributions usually take the form of distortionary subsidies rather than lump-sum transfers. (Is a welfare payment to low-income families lump-sum or distortionary?) Why is this so?

Government usually lacks sufficient information about endowments to institute lump-sum transfers fairly.

- In our example, must observe how much rice Boris and Natasha would have *in the absence of trades*.

We call lump-sum transfers *first-best* and distortionary subsidies *second-best* redistribution. When policies are second-best, achieving greater equity often (not always) results in departures from Pareto efficiency – the *equity–efficiency tradeoff*.

Utility possibilities frontier

Utility possibilities set: Combination of utility levels for all people that is feasible, given preferences, technology, and endowments.

Utility possibilities frontier: The upper boundary of the utility possibilities set.

- The UPF is like a budget constraint for the social planner.

A formal definition of the UPF for our 2×2 exchange economy:

$$\begin{aligned} \max u_A(x_A, y_A) \quad \text{s.t.} \quad & u_B(x_B, y_B) \geq \bar{u}_B \\ & x_A + x_B \leq X \\ & y_A + y_B \leq Y \end{aligned}$$

Each point on the UPF corresponds to a single point on the contract curve in the Edgeworth box. (How do we know?)

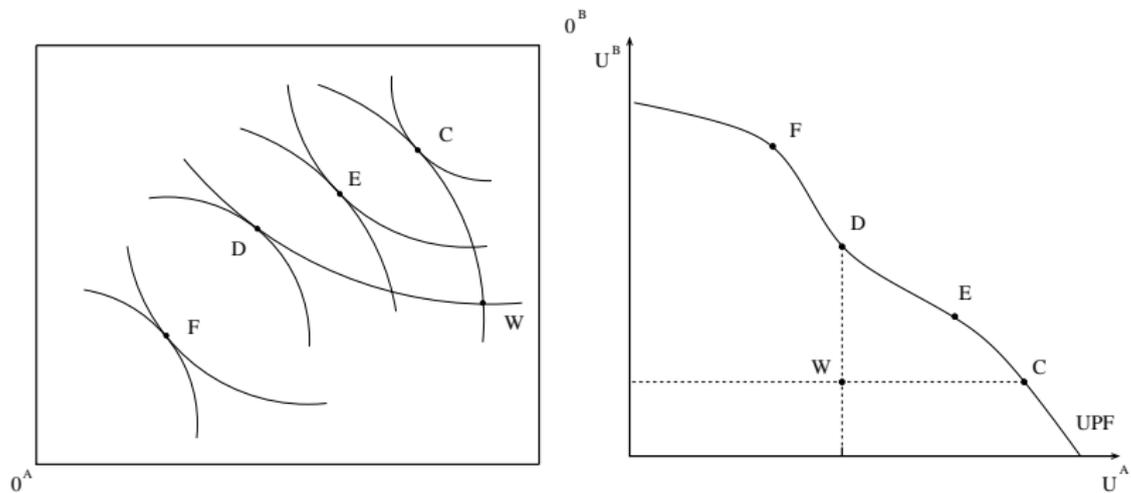


Figure: The Utility Possibilities Frontier

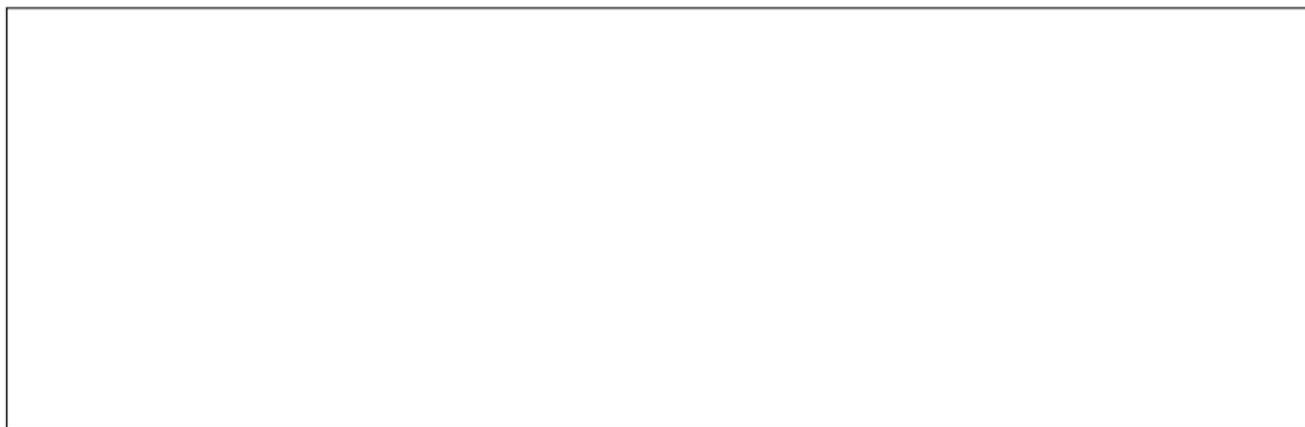
A solved example

Society has 100 units of a private good available to share between two consumers with utility functions

$$u_A(x_A) = \sqrt{10x_A}$$

$$u_B(x_B) = \sqrt{20x_B}$$

Find an equation for the utility possibilities frontier. (Why is this an unusually easy case?)



Pareto principle

How should society rank points on or inside the UPF?

Pareto principle: Given allocations A and B , society should prefer A to B if some people are better off at A , and no person is worse off at A .

We say that “ A is **Pareto superior** to B ” and that allocations A and B are **Pareto ranked**. (Are all pairs Pareto ranked?)

Note distinction between **Pareto efficient** (unary) and **Pareto superior** (binary).

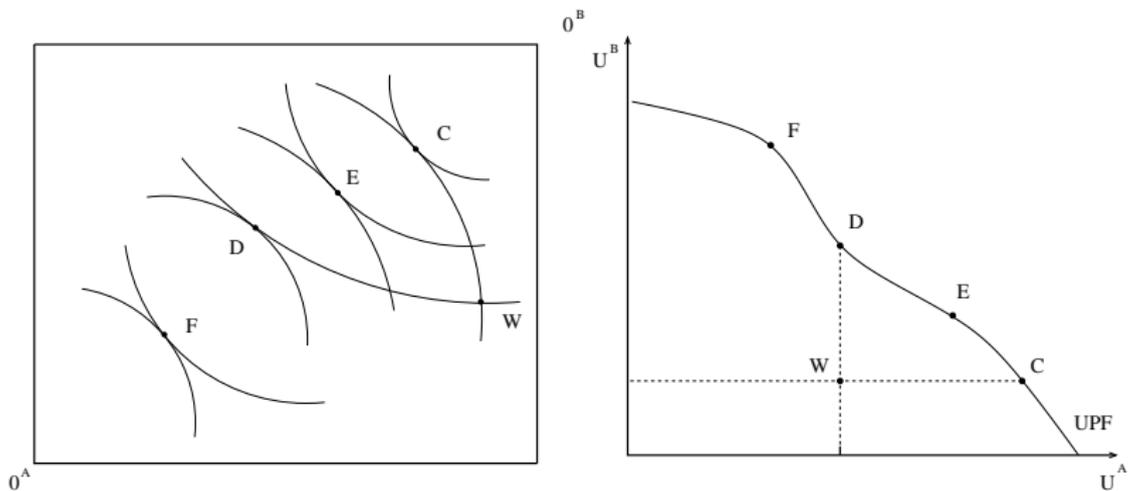


Figure: The UPF and Pareto ranking

Exercise: Which labelled allocations are **Pareto efficient**? Which are **Pareto ranked**? Is every Pareto efficient allocation Pareto superior to every Pareto inefficient allocation?

Social welfare functions

Social welfare function: A function $W(U_1, U_2, \dots, U_n)$ representing society's preferences over distribution of utility levels for each person in society.

The SWF is like a utility function for a social planner. Two polar examples:



- ① *utilitarian SWF:*

$$W(u_P, u_R) = u_P + u_R$$

- ② *Rawlsian SWF:*

$$W(u_P, u_R) = \begin{cases} u_P & \text{if } u_P \leq u_R \\ u_R & \text{if } u_R < u_P \end{cases}$$

(That's really him.)

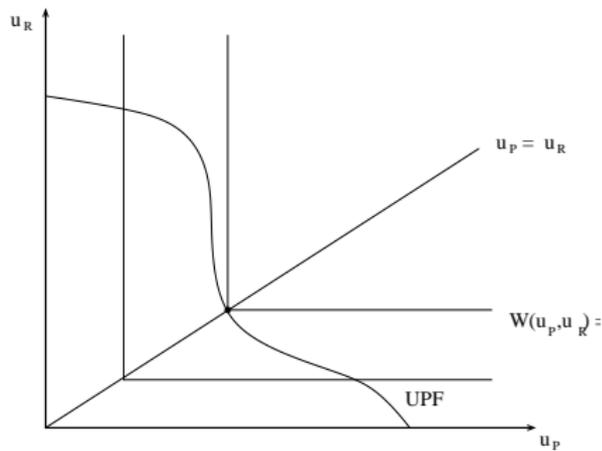
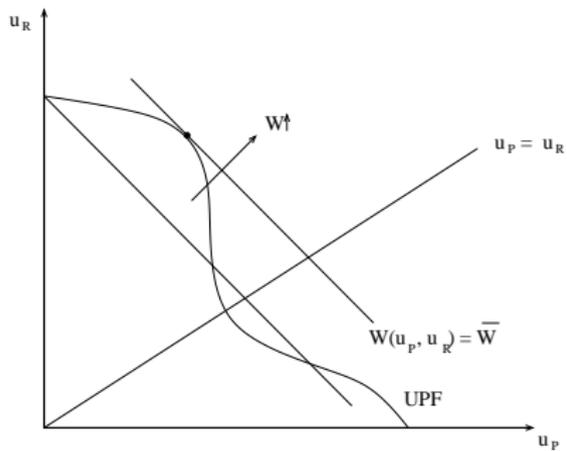


Figure: Utilitarian and Rawlsian social welfare functions.

Key concepts

- positive and normative analysis
- market failure
- Pareto efficiency
- competitive equilibrium
- First Welfare Theorem
- Second Welfare Theorem
- equity–efficiency tradeoff
- social welfare function