

## Chapter 3. Welfare Economics

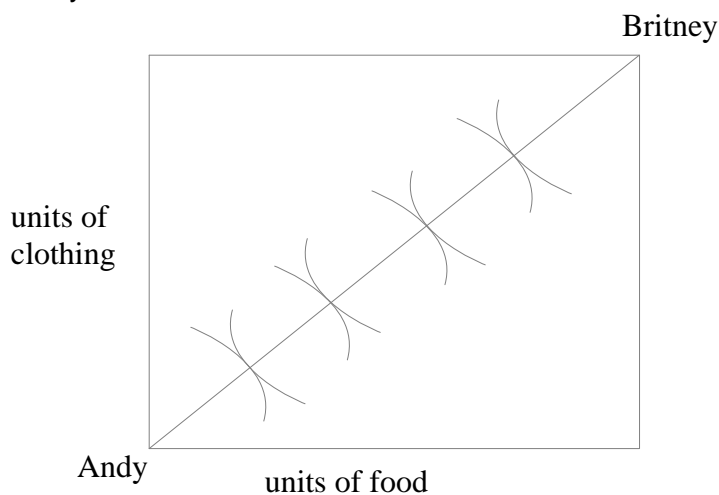
**Public finance** can be described as the public sector economics. Given the enormous diversity of the government's economic activities, a systematic framework is needed to assess the desirability of various government actions. The framework is called **welfare economics**. It compares alternative economic states to decide which is socially most desirable.

To explain this theory, we start with a simple pure **exchange economy**.

- Fixed supply of goods
- 2 individuals: Andy (A) & Britney (B)
- 2 goods: Food (F) & Clothing (C)

All important results from this two good-two person case hold in economies with many people and commodities.

To depict the distribution of food and clothing between Andy and Britney, we use an **Edgeworth Box**. Any point within the Edgeworth Box represents some allocation of both goods between Andy and Britney.



To represent the preferences of both individuals we use **indifference curves**, graphs showing combinations of goods for which a consumer is indifferent. Indifference curves with greater numbers represent higher levels of happiness (utility).

Given a set of alternative allocations and a set of individuals, a movement from one allocation to another that can make at least one individual better off, without making any other individual worse off, is called a **Pareto improvement**. An allocation of resources is **Pareto-efficient** when it is not possible to make someone better off without making someone else worse off (no further Pareto improvements can be made). Pareto efficiency is the economist's benchmark of efficient performance for an economy.

A whole set of Pareto-efficient points can be found in the Edgeworth Box. The locus of all the Pareto-efficient points is called the **contract curve**. As you can see, at a Pareto-efficient allocation the indifference curves are tangent – the slopes of the indifference curves are equal.

In economic terms, the absolute slope of the indifference curve equals the willingness to trade one commodity for the another. This is called the **marginal rate of substitution (MRS)**.

We can conclude that Pareto efficiency requires equal MRS for all consumers:

$$MRS(f,c)_A = MRS(f,c)_B$$

So far we assumed that the production of the commodities was fixed (exchange economy). Now we will look at the production. The supply of the production factors is limited. The quantity of the two goods can change. More apples and less fig leaves can be produced, or more fig leaves and less apples.

The production possibilities curve shows the maximum quantity of one output that can be produced, given the amount of the other output. The slope of the production possibilities curve at any given point is called the marginal rate of transformation (MRT). It describes numerically the rate at which one good can be transformed into the other. It is useful to express the MRT in terms of marginal cost (MC) – the incremental production cost of one more unit of output.

$$\text{MRT}(f,c) = \frac{\text{MC}(f)}{\text{MC}(c)}$$

The new Pareto efficiency condition (with variable production) becomes:

$$\text{MRT}(f,c) = \text{MRS}(f,c)_{\text{ANDY}} = \text{MRS}(f,c)_{\text{BRITNEY}}$$

In words: the rate at which food can be transformed into clothing (MRT) must equal the rate at which consumers are willing to trade food for clothing (MRS).

### First Fundamental Theorem of Welfare Economics

A Pareto-efficient allocation of resources emerges if:

- All consumers and producers act as perfect competitors (*perfect competition*). No one has market power.
- There exists a market for each and every commodity (*existence of markets*).

Under these assumptions, the *First Fundamental Theorem of Welfare Economics* tells us that a competitive economy automatically allocates resources efficiently, without any need for centralized direction. In a competitive market, all people face the same prices. Consumers and producers are so small relative to the market that they cannot affect the prices.

Utility maximization requires: (1)  $\text{MRS}(f,c) = P(f)/P(c)$

Remember the profit maximization condition:  $P = MC$

So  $\text{MC}(f)/\text{MC}(c) = P(f)/P(c)$

But  $\text{MC}(f)/\text{MC}(c) = \text{MRT}(f,c)$

Therefore (2)  $\text{MRT}(f,c) = P(f) / P(c)$

Combining both formulas yields  $\text{MRS}(f,c) = \text{MRT}(f,c)$

Because a competitive economy automatically allocates resources efficiently, it is hard to imagine what role the government plays in this economy. Things are really much more complicated than described in the First Theorem. The economic concept of efficiency is not the only thing that a society might care about. In particular, the theorem says nothing about the distributional equity of the outcome. Efficiency isn't everything; fairness matters to.

### Fairness

The utility possibility curve is derived from the contract curve. It shows the maximum amount of one person's utility given the other individual's utility level. The points on the curve are Pareto-efficient, but represent very different distributions of real income. All points on or below the utility possibilities curve are attainable by society; all points above are unattainable.

But which point on the utility possibility curve is the best? The solution to this question is to postulate a social welfare function, which embodies society's views on the relative deservedness of both individuals:

$$W = F(U_A, U_B).$$

Society's welfare depends on the utilities of each of its members. A social welfare function leads to a set of indifference curves between people's utilities. The function is downward sloping. This indicates that if B's utility decreases, the only way to maintain a given level of social welfare is to increase A's utility, and vice versa. An increase in any individual's utility will increase social welfare. Social welfare is maximized (a 'fair' distribution of utility) when the utility possibilities curve is tangent to the highest attainable utility indifference curve.

If society prefers an equal distribution of income to efficiency, an inefficient situation can be preferred. Government intervention may be necessary to achieve a "fair" distribution of utility. But how should the government intervene? The *Second Fundamental Theorem of Welfare Economics* states that a society can attain any Pareto-efficient allocation of resources by:

- Assigning initial endowments fairly
- Letting people freely trade

If necessary to ensure fairness, the government should redistribute income, but then step out of the way – no interference with prices or allocation.

#### Market failure

A second reason for government intervention is market failure. Failing to allocate resources efficiently may be caused by:

- **Market power:** a firm with market power (monopoly, oligopoly, monopolistic competition) may be able to raise price above marginal cost by supplying less output than a competitor would ( $P > MC$ ). An insufficient quantity of resources is devoted to the commodity.
- **Non-existence of markets:** often a market fails to emerge, because of:
  - *Asymmetric information:* one party in a transaction has information that is not available to the other party.
  - *Externalities:* a situation in which one person's behavior affects the welfare of another in a way that is outside existing markets. The price system fails to provide correct signals about the opportunity cost of a commodity.
    - *Public goods:* A commodity that is nonrival and nonexcludable in consumption. Means that the fact that one person consumes it does not prevent anyone else from doing so as well. It is too expensive or impossible to prevent anybody from consuming it. The market mechanism may fail to force people to reveal their preferences for public goods, and possibly result in insufficient resources being devoted to them.

The fact that the market does not allocate resources perfectly does not necessarily mean the government can do better. Each case must be evaluated on its own merits.

Although the theory of welfare economics provides a coherent and useful framework for analyzing policy, it is not universally accepted:

- It aims to maximize people's utilities (other goals are possible).
- Individuals may not know their true preferences.
- It focuses on results and does not pay much attention to the processes used to achieve results.

The framework of welfare economics encourages us to ask three key questions whenever a government activity is proposed:

- Will it have desirable distributional consequences?
- Will it enhance efficiency?
- Can it be done at a reasonable cost?

If the answers to these questions is no, the market should probably be left alone.