Public Economics

Lecture 2: Market Efficiency

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Outline of Lecture 2

Outline

Efficiency of Private Markets

Private markets can lead to efficient resource allocation:

- Adam Smith's "invisible hand": self-interest unintentionally promotes public interest.
- Entrepreneurs drive efficiency and innovation by responding to profit opportunities.
- If a good passes the "market test" (value $>$ production cost), it will be produced without government intervention.
- Competition eliminates inefficiencies and ensures better resource allocation.

But: Market failures (e.g., unemployment, pollution) can prevent efficiency.

- The public sector can address these failures and enhance overall efficiency.

Welfare Economics and Pareto Efficiency

- Welfare economics deals with normative questions: what to produce, how to produce, for whom, and who decides.
- How can we measure market efficiency and resource allocation?

Pareto efficiency

A resource allocation is Pareto efficient when it's NOT possible to make someone better off without making someone else worse off

- If we can find a way to make some people better off without making anybody else worse off, we have a **Pareto improvement**.
- If an allocation allows for a **Pareto improvement**, it is called Pareto inefficient.
- if an allocation is such that no Pareto improvements are possible, it is called **Pareto efficient.**

Pareto Improvements and the Pareto Principle

- **Pareto improvements** occur when some are made better off without making anyone worse off.

  Example: A profitable bridge project is only a Pareto improvement if no one is negatively impacted.
- Not all changes meet this standard due to **indirect effects** (e.g., noise from infrastructure).
- Economists seek **"packages" of changes** that together lead to Pareto improvements.

  Example: Reducing steel tariffs + raising taxes slightly to subsidize the steel industry.
- The Pareto principle suggests pursuing all Pareto improvements.

Pareto Efficiency and Individualism

- Pareto efficiency is individualistic, focusing on each individual's welfare rather than addressing inequality.
- A change that benefits the rich but leaves the poor unaffected can still be a Pareto improvement.
- Each individual's perception of his or her own welfare that counts.
  $\longrightarrow$ It respects consumer sovereignty: individuals are considered the best judges of their own needs and interests.

Pareto-Efficiency

Pareto efficiency implies the following:

- All resources are used efficiently in the production.
- All resources are allocated without waste.
- All trades, where both parties are (weakly) better off have already happened.

Important

Pareto efficiency does not imply an equal or fair distribution of resource allocations.

Example: A change that makes the rich better off but leaves the poor unaffected is still a Pareto improvement.

- Pareto efficient allocations can be inequitable and socially undesirable.

The Fundamental Theorems of Welfare Economics:

1. Theorem: **If the economy is competitive, it is Pareto efficient.**
   - Competitive markets tend to automatically reach efficiency. There can be many efficient Pareto efficient allocations.
2. Theorem: **Every Pareto efficient resource allocation can be obtained through a competitive market process with an initial redistribution of wealth.**
   - What if we want to obtain a particular distribution? If we transfer money from one individual to another, then let the market forces work, we will obtain another (different) Pareto efficient allocation.

Decentralized vs. Centralized Systems

- **Decentralized system:** Decisions about production and consumption are made by firms and individuals.
- **Centralized system:** A single planner or agency makes all economic decisions (e.g., former Soviet Union, North Korea, Cuba).
- The second theorem shows that, with ideal conditions, decentralized competitive markets can be as efficient as centralized systems.
- The role of government should be limited to the redistribution of resources.

A word of caution: theorems are logical propositions in which the conclusion follows from the assumptions.

- Purely decentralized (private) systems do not work perfectly and there is need for public sector involvement.
- Centralized system also don't work (e.g., absence of price signal $\rightarrow$ difficulty to determine what is needed, concentration of power $\rightarrow$ dictatorship).

What are your questions now?

Let's look more closely at the two welfare theorems.

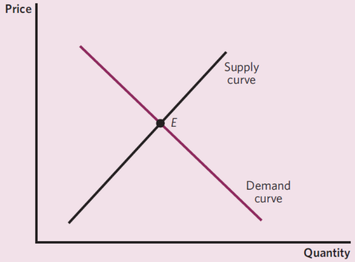
Outline

Competitive Equilibrium

- In deciding how much to demand and supply, individuals and firms equate the marginal benefit (MB) with the marginal cost (MC).
- The market will autonomously tend to reach the equilibrium point E, where demand equals supply.

FIGURE 3.1

EFFICIENCY FROM THE PERSPECTIVE OF A SINGLE MARKET
In deciding how much to demand, individuals equate the marginal benefit they receive from consuming an extra unit with the marginal cost, the price they have to pay. In deciding how much to supply, firms equate the marginal benefit they receive, which is just the price, with the marginal cost. At the market equilibrium, where supply equals demand, the marginal benefit (to consumers) is equal to the marginal cost (to firms)—and each equals the price.



Stiglitz and Rosengard (2015)

Demand Curve: Consumer's Problem

- Consumer receives utility $U(x_1)$ from consuming good x_1
- Each unit of good x_1 costs p_1 and hence creates costs $C = x_1 p_1$

How much does she consume?

$$\underset{x_1}{argmax}\, U(x_1) - x_1 p_1$$

$$FOC : \frac{\partial(U(x_1) - x_1 p_1)}{\partial x_1} = \frac{\partial U(x_1)}{\partial x_1} - p_1 = 0$$

$$\iff \underbrace{\frac{\partial U(x_1)}{\partial x_1}}_{\text{marginal benefit of consumption}} = \underbrace{p_1}_{\text{marginal costs of consumption}}$$

$$SOC : \frac{\partial^2(U(x_1) - x_1 p_1)}{\partial x_1^2} < 0$$

Demand Curve: Consumer's Problem

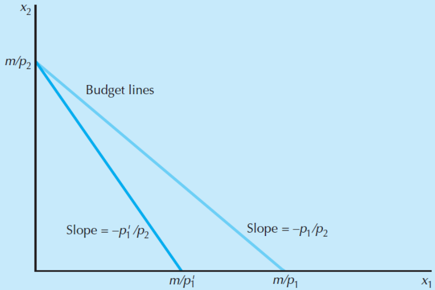
However, consumers not only consume one good, but face trade-offs between spending their income on the product/ service of interest x_1 and all other products and services, represented by x_2. Additionally, they have an upper limit of how much they can spend m.

- Consumer receives utility $U(x_1, x_2)$ from consuming goods x_1 and x_2
- She faces the budget constraint $p_1 x_1 + p_2 x_2 \leq m$
- where p_i is the price of good i and m the income

$$\underset{x_1, x_2}{\text{argmax}} \, U(x_1, x_2)$$

$$s.t. p_1 x_1 + p_2 x_2 \leq m$$

Demand Curve: Consumer's Problem

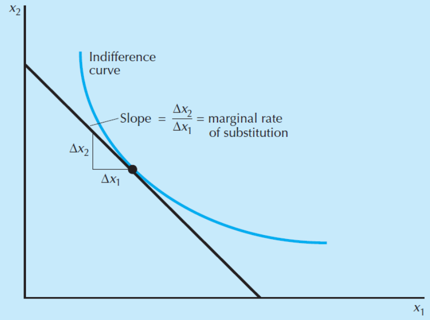


Increasing price. If good 1 becomes more expensive, the budget line becomes steeper.

Source: Varian () Figure 2.3

- **Budget constraint**: the amount of income a consumer can spend on various goods.
- Change in one of the prices (here p_1), changes the slope of the budget line: $-\frac{p_1}{p_2}$

Demand Curve: Consumer's Problem



The marginal rate of substitution (MRS). The marginal rate of substitution measures the slope of the indifference curve.

Source: Varian (2010) Figure 3.11

- **Indifference curve**: Gives the combination of x_1 and x_2, which give the same level of utility.
- **Marginal rate of substitution** ($\frac{\Delta x_2}{\Delta x_1}$): The amount of x_1 that an individual is willing to give up in exchange for a unit of x_2.
- **Optimal Choice:** Where the slope of the budget line equals the MRS : $-\frac{\Delta x_2}{\Delta x_1} = -\frac{p_1}{p_2}$

Consumer's Problem – The Lagrangian Method

$$\underset{x_1,x_2}{\text{argmax}} U(x_1,x_2); s.t. p_1x_1 + p_2x_2 \leq m$$

Set up the Lagrangian function and maximize it:

$$\mathcal{L} = U(x_1,x_2) - \lambda(m - p_1x_1 - p_2x_2)$$

$$\frac{\partial \mathcal{L}}{\partial x_1} = \frac{\partial U}{\partial x_1} + \lambda p_1 = 0 \longrightarrow \frac{\partial U}{\partial x_1}\frac{1}{p_1} = -\lambda \quad (1)$$

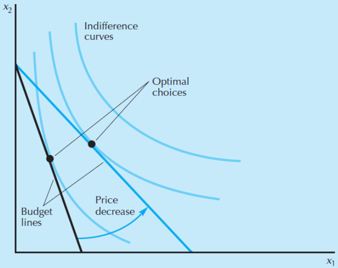
$$\frac{\partial \mathcal{L}}{\partial x_2} = \frac{\partial U}{\partial x_2} + \lambda p_2 = 0 \longrightarrow \frac{\partial U}{\partial x_2}\frac{1}{p_2} = -\lambda \quad (2)$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = m - p_1x_1 - p_2x_2 = 0 \longrightarrow m = p_1x_1 + p_2x_2 \quad (3)$$

Combining (1) and (2) leads to:

$$\underbrace{-\frac{\partial U/\partial x_1}{\partial U/\partial x_2}}_{\text{Marginal Rate of Substitution (MRS)}} = \underbrace{-\frac{p_1}{p_2}}_{\text{Slope of Budget Line}}$$

Demand Curve: Individual Demand



An ordinary good. Ordinarily, the demand for a good increases when its price decreases, as is the case here.

Source: Varian (2010) Figure 6.9

- **Indifference curve**: Gives the combination of x_1 and x_2, which give the same level of utility.
- If p_1 decreases, demand for x_1 increases.

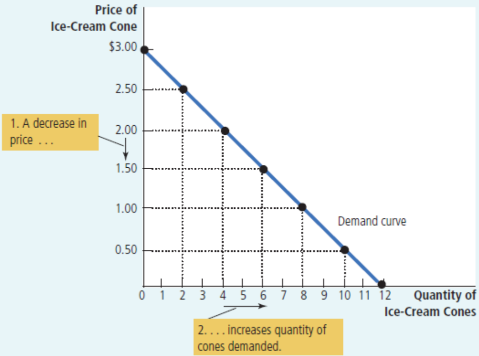
Demand Curve: Individual Demand

FIGURE 1

Catherine's Demand Schedule and Demand Curve

The demand schedule is a table that shows the quantity demanded at each price. The demand curve, which graphs the demand schedule, illustrates how the quantity demanded of the good changes as its price varies. Because a lower price increases the quantity demanded, the demand curve slopes downward.

Price of Ice-Cream Cone	Quantity of Cones Demanded
$0.00	12 cones
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0



Source: Mankiw (2018)

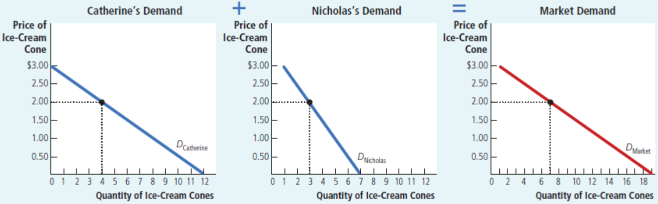
Demand Curve: Market Demand

The quantity demanded in a market is the sum of the quantities demanded by all the buyers at each price. Thus, the market demand curve is found by adding horizontally the individual demand curves. At a price of $2.00, Catherine demands 4 ice-cream cones and Nicholas demands 3 ice-cream cones. The quantity demanded in the market at this price is 7 cones.

FIGURE 2

Market Demand as the Sum of Individual Demands

Price of Ice-Cream Cone	Catherine		Nicholas		Market
$0.00	12	+	7	=	19 cones
0.50	10		6		16
1.00	8		5		13
1.50	6		4		10
2.00	4		3		7
2.50	2		2		4
3.00	0		1		1



Source: Mankiw (2018)

Supply Curve: Firm's Problem

Suppose a firm faces **perfect competition:**

- Large number of consumers and producers
- Free market entry and exit
- No transaction costs
- Complete information

$\Longrightarrow$ Each firm's output (q_i) is marginal and does not affect the market price $P(Q)$.

$$Q = \sum_{i=1}^{n} q_i \quad \text{and} \quad \lim_{n \to \infty} \frac{q_i}{Q} = 0$$

$\Longrightarrow$ The firm takes the market price as given (exogenous market price).

Supply Curve: Firm's Problem

The firm takes the market price P as given (exogenous price) and maximizes its profit π by choosing the quantity q to produce, given the cost function $C(q)$.

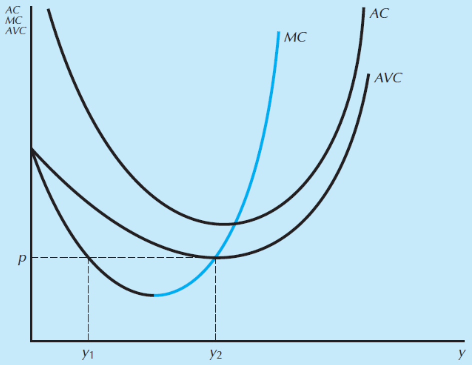
$$\underbrace{\pi}_{\text{profit}} = \underbrace{Pq}_{\text{revenue}} - \underbrace{C(q)}_{\text{variable costs}} - \underbrace{F}_{\text{fixed costs}}$$

$$\text{FOC} : \frac{\partial \pi}{\partial q} = P - \frac{\partial C(q)}{\partial q} = 0$$

$$\iff \underbrace{P}_{\text{marginal revenue}} = \underbrace{\frac{\partial C(q)}{\partial q}}_{\text{marginal costs (MC)}}$$

$$SOC : \frac{\partial^2 \pi}{\partial q^2} < 0$$

Supply Curve: Firm's Problem



Marginal cost and supply. Although there are two levels of output where price equals marginal cost, the profit-maximizing quantity supplied can lie only on the upward-sloping part of the marginal cost curve.

Source: Varian (2010) Figure 22.2

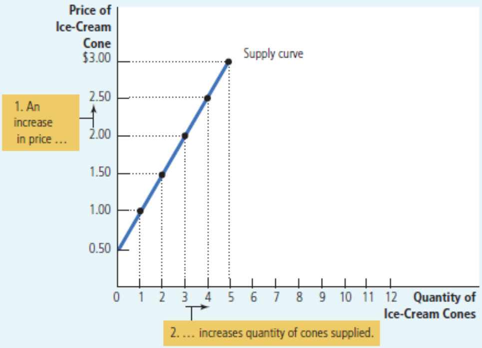
Supply Curve: Individual Supply

The supply schedule is a table that shows the quantity supplied at each price. This supply curve, which graphs the supply schedule, illustrates how the quantity supplied of the good changes as its price varies. Because a higher price increases the quantity supplied, the supply curve slopes upward.

FIGURE 5

Ben's Supply Schedule and Supply Curve

Price of Ice-Cream Cone	Quantity of Cones Demanded
$0.00	0 cones
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5



Source: Mankiw (2018)

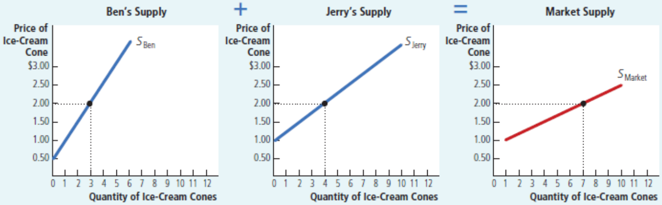
Supply Curve: Market Supply

FIGURE 6

Market Supply as the Sum of Individual Supplies

The quantity supplied in a market is the sum of the quantities supplied by all the sellers at each price. Thus, the market supply curve is found by adding horizontally the individual supply curves. At a price of $2.00, Ben supplies 3 ice-cream cones and Jerry supplies 4 ice-cream cones. The quantity supplied in the market at this price is 7 cones.

Price of Ice-Cream Cone	Ben		Jerry		Market
$0.00	0	+	0	=	0 cones
0.50	0		0		0
1.00	1		0		1
1.50	2		2		4
2.00	3		4		7
2.50	4		6		10
3.00	5		8		13



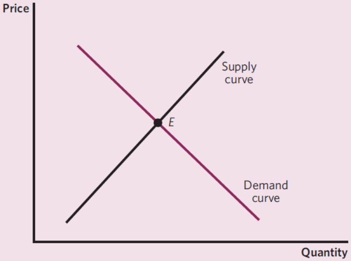
Source: Mankiw (2018)

Competitive Equilibrium

- In deciding how much to demand and supply, individuals and firms equate the marginal benefit (MB) with the marginal cost (MC).
- The market will autonomously tend to reach the equilibrium point E, where demand equals supply. [video]

FIGURE 3.1

EFFICIENCY FROM THE PERSPECTIVE OF A SINGLE MARKET
In deciding how much to demand, individuals equate the marginal benefit they receive from consuming an extra unit with the marginal cost, the price they have to pay. In deciding how much to supply, firms equate the marginal benefit they receive, which is just the price, with the marginal cost. At the market equilibrium, where supply equals demand, the marginal benefit (to consumers) is equal to the marginal cost (to firms)—and each equals the price.



Stiglitz and Rosengard (2015)

Are there any questions?

From focusing on a single market, let's zoom out and look at the welfare of the population overall and the production possibilities overall.

From Competitive Equilibrium to Economic Efficiency

- So far, we explored the concept of competitive equilibrium in a single market.
- **Key Point:** In a competitive equilibrium, prices adjust so that supply equals demand, ensuring no excess supply or demand in that market.
- **Link to efficiency of an entire economy:**
  - Competitive equilibrium is a *necessary condition* for economic efficiency.
  - Now, we extend this idea to evaluate efficiency across the whole economy.

Analyzing Economic Efficiency

Three Aspects of Pareto Efficiency:

1. **Exchange Efficiency:**
   - Goods must be allocated to those who value them most.
   - Example: chocolate ice cream to a person who prefers chocolate, vanilla to someone who prefers vanilla.
2. **Production Efficiency:**
   - Output maximized with the available resources.
   - Production efficiency occurs when an economy cannot produce more of one good without sacrificing another (given fixed resources).
3. **Product Mix Efficiency:**
   - Goods produced should match individual preferences.
   - Example: if people prefer ice cream over apples and it's cheaper to produce, more ice cream should be produced.

Together, these conditions lead to Pareto Efficiency of the entire economy.

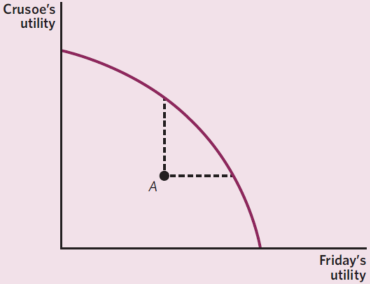
Outline

Exchange Efficiency: Utility Possibility Curve

FIGURE 3.2

THE UTILITY POSSIBILITIES CURVE

The utility possibilities curve gives the maximum level of utility that one individual (Friday) can achieve, given the level of utility of the other individual (Crusoe). Along the frontier, it is not possible for Crusoe to consume more unless Friday consumes less. Therefore, the utility possibilities curve is downward sloping: the higher Crusoe's utility, the lower the maximum level of Friday's utility.



Stiglitz and Rosengard (2015)

- The utility possibilities curve represents the maximum utility that can be achieved by two consumers.
- A Pareto efficient economy operates along this curve, where improving one person's utility would reduce another's.

Exchange Efficiency: Utility Possibility Curve

FIGURE 3.2

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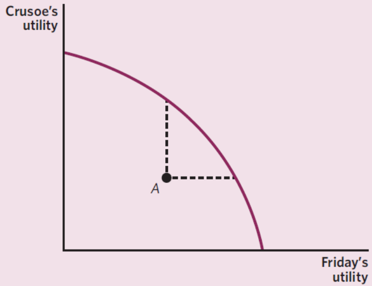


Stiglitz and Rosengard (2015)

- **1st theorem:** When markets are competitive, the economy lies on the utility possibilities curve and is Pareto efficient.
- **2nd theorem:** Any point on the curve can be reached by redistributing initial wealth.

Budget Constraints: Crusoe's Example

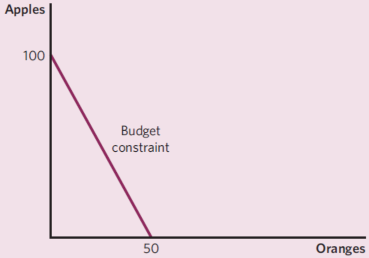


FIGURE 3.3

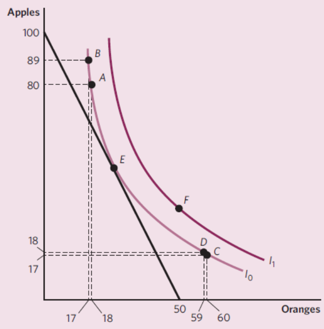
CRUSOE'S BUDGET CONSTRAINT

Given income of $100, the price of oranges of $2, and the price of apples of $1, an individual can purchase any combination of apples and oranges along or to the left of the budget constraint. Any combination to the right of the budget constraint is unaffordable. The slope of the budget constraint is based on the relative price of oranges and apples.

Stiglitz and Rosengard (2015)

- Crusoe has $100 to spend on apples and oranges. Apples cost $1 each, and oranges cost $2 each.
- Crusoe's budget constraint shows the trade-off: for every orange he buys, he must give up two apples.

Indifference Curves: Crusoe's Preferences



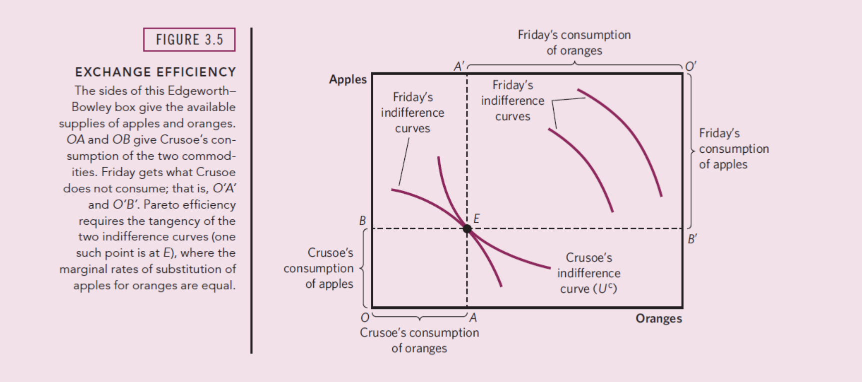
Stiglitz and Rosengard (2015)
Figure 3.4

- Indifference curves represent combinations of goods yielding the same utility; e.g., curve I_0 indicates combinations equally attractive to 80 apples and 18 oranges (point A). Points A, B, C,D, E are all equally attractive.
- The slope of the indifference curve reflects the marginal rate of substitution (MRS), showing how many apples Crusoe is willing to give up for an additional orange.
- As Crusoe consumes more oranges, the MRS diminishes; he requires less apples to compensate for giving up oranges.
- The optimal choice occurs where the highest indifference curve is tangent to the budget constraint $\longrightarrow -\text{MRS} = -\frac{p_1}{p_2}$ (point E).

Exchange Efficiency

- Exchange efficiency occurs when goods are distributed so that no one can be made better off without making someone else worse off.
- It ensures that there is no room for further trades that would benefit both parties.
- **Example:**
  - Crusoe is willing to trade 1 orange for 1 apple.
  - Friday, on the other hand, is willing to trade 3 apples for 1 orange.
  - They agree to a trade: Crusoe gives Friday 1 orange, and Friday gives Crusoe 2 apples.
  - After the trade, both are better off: Crusoe gets 2 apples (but only wanted 1), and Friday only gives up 2 apples (but was willing to give 3).
- After this trade, Crusoe and Friday move to new points on their indifference curves, each with a new marginal rate of substitution (MRS).
  - Crusoe likely desires more apples to compensate for giving up oranges (as he has fewer oranges and more apples now).
  - Friday would be willing to give up fewer apples for a new orange (as he has more oranges and less apples now).
  - Trade is efficient (and will occur) until both have the same marginal rate of substitution.
- Exchange efficiency requires that after trade, Crusoe and Friday have the same marginal rate of substitution (MRS).

Exchange Efficiency

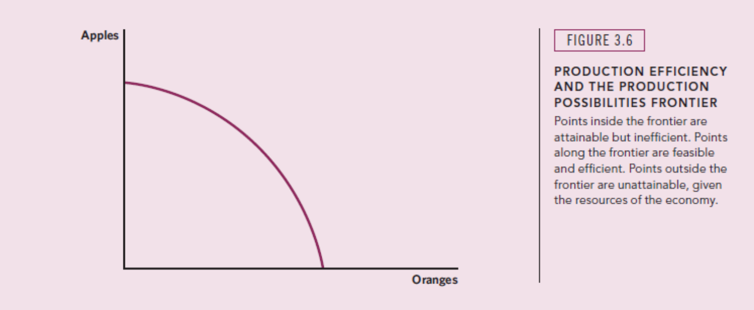


Stiglitz and Rosengard (2015)

- The Edgeworth–Bowley box shows all allocations of goods between Crusoe (bottom left) and Friday (top right).
- Pareto efficiency is achieved at point E, where Friday's highest indifference curve is tangent to Crusoe's, equalizing their marginal rates of substitution. [[click for video]]

Outline

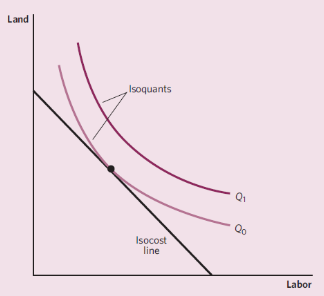
Production Efficiency: Production Possibilities Frontier



Stiglitz and Rosengard (2015)

- The Production possibility frontier shows all possibly combinations of production levels of apples and oranges.
- The production possibilities frontier illustrates the trade-off between producing apples and oranges.
- Production efficiency occurs when an economy cannot produce more of one good without sacrificing another (given fixed resources).

Production Efficiency



Stiglitz and Rosengard (2015) Figure 3.7

- Assume that all we need for producing anything is land and labor.
- The **isocost line** represents combinations of inputs (e.g., land and labor) that yield the same total cost.
- **Isoquants** show combinations of inputs that produce the same output level, similar to how indifference curves illustrate consumer preferences.
- The **marginal rate of technical substitution (MRTS)** reflects the amount of one input that must be increased to compensate for a decrease in another input.
- The optimal input choice occurs where the highest isoquant is tangent to the isocost line:
  $\longrightarrow -\text{MRTS} = -\frac{p_1}{p_2}$

Production Efficiency

- Production efficiency occurs when firms allocate resources such that no firm can increase output without reducing output for another firm.
- It ensures that there is no room for further reallocations of inputs that would benefit both firms.
- **Example:**
  - Firm A is willing to trade 1 unit of labor for 2 units of land.
  - Firm B, on the other hand, is willing to trade 3 units of land for 1 unit of labor.
  - They agree to a trade: Firm A gives Firm B 1 unit of labor, and Firm B gives Firm A 2 units of land.
  - After the trade, both firms are better off: Firm A acquires 2 units of land (but only wanted 1), while Firm B gives up only 2 units of land (but was willing to give up 3).
- After this trade, both firms move to new points on their isoquants, each with a new marginal rate of technical substitution (MRTS).
  - Firm A likely desires more land to compensate for having given up some labor.
  - Firm B would be willing to give up fewer units of land for additional labor, as it now has more labor and fewer land units.
  - An exchange in production inputs is efficient (and will continue) until both firms have the same marginal rate of technical substitution.
- Production efficiency requires that after the trade, Firm A and Firm B have the same marginal rate of technical substitution (MRTS).

Production Efficiency

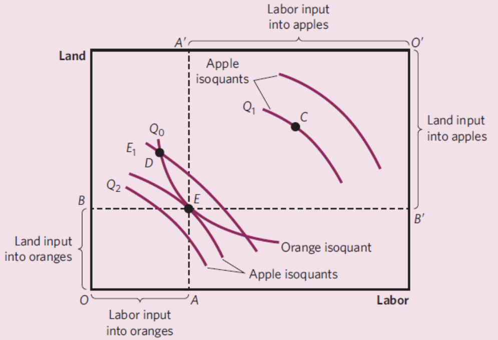


FIGURE 3.8

PRODUCTION EFFICIENCY
The sides of this Edgeworth–Bowley box give the available supply of resources—land and labor. Resources used in the production of oranges are given by *OA* and *OB*; resources not used in the production of oranges are used in the production of apples, *O′A′* and *O′B′*. Production efficiency requires the tangency of the isoquants. At tangency points, such as *E*, the marginal rate of substitution of land for labor is the same in the production of apples and oranges.

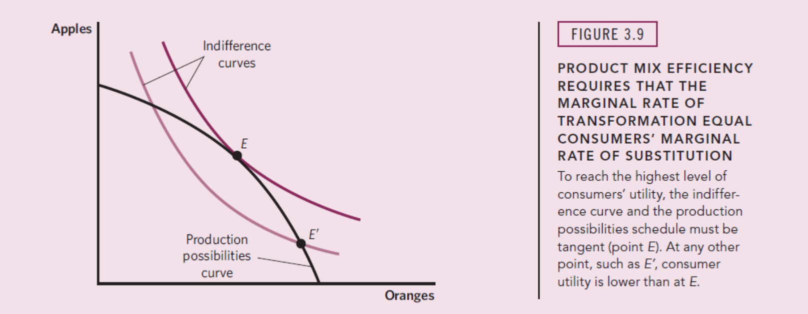
Stiglitz and Rosengard (2015)

- The Edgeworth–Bowley box illustrates all allocations of inputs (land and labor) between Firm O (bottom left) and Firm O' (top right).
- Pareto efficiency is achieved at point E, where Firm O's highest isoquant is tangent to Firm O''s, equalizing their marginal rates of technical substitution (MRTS).

Outline

Product Mix Efficiency

- **Product mix efficiency** considers both technical feasibility and individuals' preferences when it comes to choosing the best mix of apples and oranges.
- The slope of the production possibilities curve is called the **marginal rate of transformation (MRT)**.
- Under perfect competition, MRT = MRS.



Stiglitz and Rosengard (2015)

Basic Conditions for Pareto Efficiency

1. **Exchange Efficiency:** The marginal rate of substitution between any two goods must be the same for all individuals.
2. **Production Efficiency:** The marginal rate of technical substitution between any two inputs must be the same for all firms.
3. **Product Mix Efficiency:** The marginal rate of transformation must equal the marginal rate of substitution.

1. Theorem: **If the economy is competitive, it is Pareto efficient...**
   ...because it satisfies all three conditions.

Outline

Welfare Theorem 2

1. Theorem: **If the economy is competitive, it is Pareto efficient.**
2. Theorem: **Every Pareto efficient resource allocation can be obtained through a competitive market process with an initial redistribution of wealth.**

Welfare Theorem 2

- Even with no market failures, free market outcomes might generate substantial inequality.
- Inequality is often viewed as the biggest issue with market economies.

2nd Welfare Theorem:

- Any Pareto Efficient allocation can be achieved by:
  1. **Suitable redistribution** of initial endowments
     (e.g., individualized lump-sum taxes based on individual characteristics, not behavior)
  2. Then, letting markets work freely.

$\Longrightarrow$ *No conflict between efficiency and equity.*

Example: 2nd Welfare Theorem

- Suppose the economy is populated by 50% disabled people who are unable to work (earning \$0) and 50% able people who can work and earn \$100.
- **Free market outcome:** Disabled individuals have \$0, able individuals have \$100.

2nd Welfare Theorem:

- The government can identify the disabled and the able (even if the able do not work).
- **Redistribution:** The government can tax the able by \$50 (regardless of whether they work) and give \$50 to each disabled person.
- The able will continue working because if they don't, they would still have to pay \$50 and earn zero income.
- Both able and disabled individuals have \$50 in the end.

Example: Welfare Theorem 2

- Suppose that **households** supply labour (L) and consume a single good (X)
- Two types of households 1 and 2:
  - Different productivity levels (wage): w_1 and w_2, with $w_1 < w_2$
  - Same utility from consumption and free time (1-L): $logU^1 = logU^2 = \alpha logX + (1-\alpha)log(1-L)$ where $\alpha \in (0,1)$
- Household 1 consumes X_1 units of the product, and household 2 X_2. Together, they cannot consume more than they produce and thus face the production constraint: $X_1 + X_2 = w_1 L_1 + w_2 L_2$

$$\underset{L_1, L_2, X_1, X_2}{argmax} \; logU^1 + logU^2$$

$$s.t. X_1 + X_2 = w_1 L_1 + w_2 L_2$$

Source: Atkinson and Stiglitz (2015)

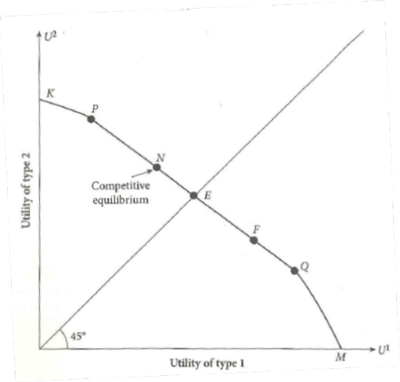
Example: Solving

Solving this problem (see Atkinson and Stiglitz (2015), p.285ff), the utility levels for household 1 and 2 are:

- $U^1 = Aw_1^{\alpha}$
- $U^2 = Aw_2^{\alpha}$

The more productive household $(w_2 > w_1)$ receives more utility, because they work more efficiently and hence can either buy more products and/ or enjoy more free-time.

Example: Welfare Theorem 2



- The more productive household 2 ($w_2 > w_1$) receives more utility than household 1 (point N).
- How can we reach other Pareto efficient allocations on this possibility frontier, (e.g. point E)?

$\Longrightarrow$ 2nd Welfare Theorem: 'simply' transfer some initial wealth from household 2 to household 1.

Example: Welfare Theorem 2

2nd Welfare Theorem: every Pareto efficient resource allocation can be obtained through a competitive market process with an initial redistribution of wealth.

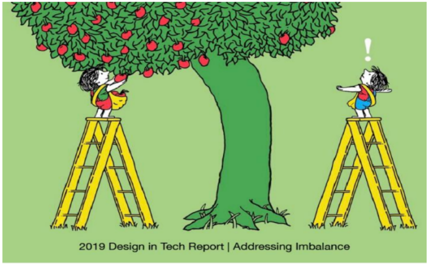
- Let there be a lump-sum transfer T, where household 2 transfers some wealth T to household 1.
- Then the individual budget constraints are: $X_1 = w_1 L_1 + T$ and $X_2 = w_2 L_2 - T$
  $\longrightarrow$ Household 2 has to work more to reach the same consumption level
  $\longrightarrow$ Household 1 has to work less to reach the same consumption level

Solving this new problem (see Atkinson and Stiglitz (2015), p.285ff) yields the new individual utility levels:

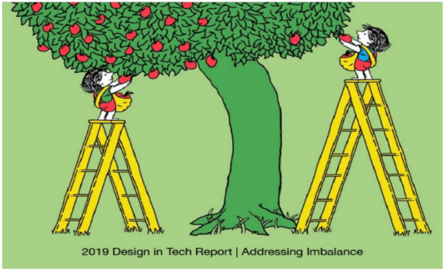
- $U^1 = A(w_1 + T)w_1^{-(1-\alpha)}$
- $U^2 = A(w_2 - T)w_2^{-(1-\alpha)}$

Plugging in any T will move us on the utility possibility frontier.

Why would we want to redistribute wealth?



Equality



Equity

- Equality means each individual or group of people is given the same resources or opportunities.
- Equity recognizes that each person has different circumstances and allocates the exact resources and opportunities needed to reach an equal outcome.

Readings for Next Week

3 Market Failure

Main Reading: Stiglitz and Rosengard (2015) Chapter 4: Market Failure
Recommended Reading: Varian (2010) Chapter 37: Asymmetric Information (37.1, 37.2, 37.3, 37.4, and 37.5)

Thank you and see you next week!

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References I

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Varian, H. (2010). Intermediate microeconomics. a modern approach (8th edition)., *NY: University of California at Berkeley* .