Public Economics

Lecture 3: Market Failure

Dr. Jonathan Stäbler
Masaryk University
Faculty of Economics and Administration

Fall 2024

Outline of Lecture 3

1. Failure of the First Welfare Theorem

1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Failure of the First Welfare Theorem

- **First Theorem:** any competitive equilibrium is Pareto efficient if
  - Perfect competition
  - Perfect information
  - Complete markets
  - No externalities or public goods
- Causes of market failures:
  1. Insufficient contracts and property rights
  2. Imperfect competition
  3. Public goods (see Lecture 4)
  4. Externalities (see Lecture 5)
  5. Incomplete markets
  6. Imperfect or asymmetric information
  7. Unemployment, inflation, and disequilibrium

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Property Rights and Contract Enforcement

Ensuring property rights and enforce contracts are fundamental government activities to provide the foundations on which all market economies rest.

- **Property rights** give the owner or right holder the ability to do with the property what they choose. That includes holding on to it, selling or renting it out for profit, or transferring it to another party.
  - Without property rights, as in common land or communist systems, there is little incentive to prevent overuse or to maintain/improve the property.
  - In market economies, improvements increase property value.
  - Protection of private property is essential for encouraging saving and investment, as individuals need security over their assets.
- **Contract enforcement** is crucial for transactions (e.g., loans, exchanges), as without enforcement, individuals and companies would be unwilling to engage in economic exchanges. $\longrightarrow$ Crucial for exchange efficiency.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Failure of Competition

Assumptions for **perfect competition:**

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

Many industries do not fulfill these characteristics:

- When there are only few firms in the markets (**Oligopoly**)
- When there is only one firm (**Monopoly**)
- Even if there are many firms, they might produce a slightly different good, and thus can influence their market price by the quantity they produce (**Monopolistic Competition**)
- When there is only one single buyer (**Monopsony**)

The Four Types of Market Structure

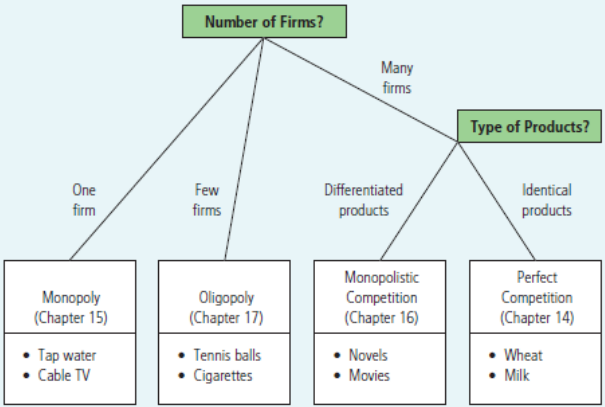


FIGURE 1

The Four Types of Market Structure

Economists who study industrial organization divide markets into four types: monopoly, oligopoly, monopolistic competition, and perfect competition.

Mankiw (2018)

Failure of Competition – Monopoly

A monopoly arise because of *barriers of entry*: *[[watch video]]*

- **Monopoly resources**: A key resource required for production is owned by a single firm.
- **Technological advantage**: A single firm has has exclusive control over a particular technology or production process.
- **The production process**: A single firm can produce output at a lower cost than can a larger number of firms.
- **Government regulation**: The government gives a single firm the exclusive right to produce some good or service.

Possible solutions:

- Support competition
- Regulations
- Public ownership
- Simply not doing anything

Failure of Competition – Monopoly

Monopoly: The one single firm influences the market price P(q) with it's produced quantity.

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

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

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

Perfect Competition: The firm takes the market price P as given (exogenous price).

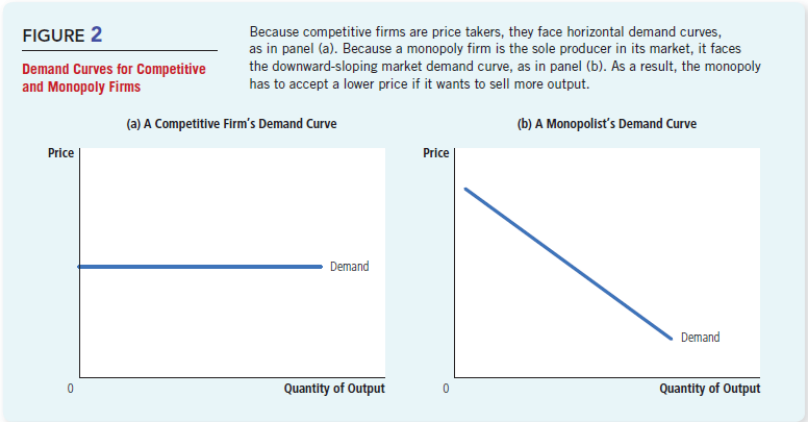
$$\underbrace{\pi}_{\text{profit}} = \underbrace{Pq}_{\text{revenue}} - \underbrace{C(q)}_{\text{variable costs}} - \underbrace{F}_{\text{fixed costs}}$$

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

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

Failure of Competition – Monopoly

A monopoly is the single firm in a market, hence it's produced quantity influences the market price.



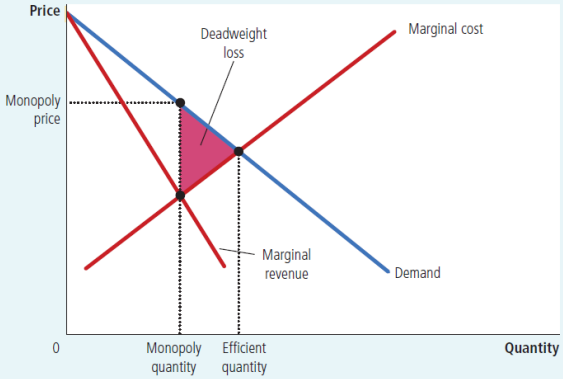
Mankiw (2018)

Failure of Competition – Monopoly

FIGURE 8

The Inefficiency of Monopoly

Because a monopoly charges a price above marginal cost, not all consumers who value the good at more than its cost buy it. Thus, the quantity produced and sold by a monopoly is below the socially efficient level. The deadweight loss is represented by the area of the triangle between the demand curve (which reflects the value of the good to consumers) and the marginal-cost curve (which reflects the costs of the monopoly producer).



Mankiw (2018)

Failure of Competition – Collusion

Even if there is a large number of firms, there can be market failures because of **collusion**.

- Firms may agree to collude and fix prices at monopoly levels.
- **Challenge:** Collusion works only if firms can enforce the agreement.
- **Antitrust laws** prohibit such agreements.

[[watch video]]

Failure of Competition – Promoting Competition

Monopolies and collusion create welfare losses (**deadweight loss**).
$\Longrightarrow$ **Government action:** Use antitrust laws to increase competition.

Antitrust tools:

- Closely monitor mergers.
- Prevent mergers (e.g., AT&T and T-Mobile in the US).
- Break a monopoly into a group of smaller companies (AT&T Breakup 1984).
- Prohibit collusion.

Failure of Competition – Regulations and Public Ownership

Monopolies and collusion create welfare losses (**deadweight loss**).

Government actions:

- Regulate monopoly behavior:
  - Mandate the price a monopoly must set, rather than allowing it to choose.
  - Which price to set? Equal to marginal costs?
  - Monopolies then have no incentive to lower their marginal costs.
- Public ownership:
  - Convert private monopolies (e.g., utilities like water, electricity) into public enterprises.
- Some argue that the government should not intervene at all.
  - Intervention is costly and may introduce inefficiencies/ distortions.
  - Distortions from interventions may outweigh the benefits of intervention.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Public Goods

Examples: national defense, basic research, construction of a lighthouse

Pure public goods hold two properties:

1. **NON-RIVALRY:** once a good is provided, then it costs nothing for an additional individual to enjoy its benefits.
2. **NON-EXCLUDABILITY:** it is difficult or impossible to exclude individuals from the enjoyment of the good.

Pure public goods are underprovided whenever the costs exceed the individual benefits, even though the total benefits of everyone are higher than the costs (**free-rider problem**).

$\Longrightarrow$ The market fails to provide the socially optimal levels of public goods.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Externalities

All those actions of one individual (or one firm) that negatively or positively affect other individuals (or firms) without being reflected in the market prices.

- **Negative externality:** whenever an individual (or firm) imposes a cost on another individual without compensating them
  Examples: Pollution (air, noise, water, light, etc.), over-fishing, passive smoking
- **Positive externality:** whenever an individual confers a benefit on another individual but does not reap a reward for providing it
  Examples: Renovating a house in the neighborhood, planting a flower garden, technology spillovers

Individuals and firms engage in too much/little of such activities, because they do not bear all the costs/reap all the benefits.
$\Longrightarrow$ The market fails to provide the socially optimal levels of goods/ services with externalities.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Incomplete Markets

Incomplete markets occur when private markets fail to supply a good or service, despite the cost of provision being lower than what individuals are willing to pay.

Examples: insurance and capital markets
Reasons:

1. **Innovation:** there is often undersupply of innovations such as new insurance policies.
2. **Transaction costs:** those expenses incurred when buying or selling a good or a service. It is costly to devise new insurance policies.
3. **Information asymmetry:** when the two parties to a transaction have different information it can come to adverse selection.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Information Asymmetry – Adverse Selection

The Market for 'Lemons': Quality Uncertainty and the Market Mechanism
George (1970), Nobel Laureate (2001) *[[Watch video]]*

If sellers are better informed about the quality of their products compared to potential buyers, low-quality products can replace high-quality products from the market.

- In such a situation, the buyer runs the risk of being sold a product of low quality.
- The "selection" of products sold may be "adverse" from the standpoint of the uninformed buyer.
- "Lemons" is a colloquial word for low-quality things.
- Motivated by the second-hand cars industry: *Why are second-hand cars so much cheeper than new cars?*

Adverse Selection

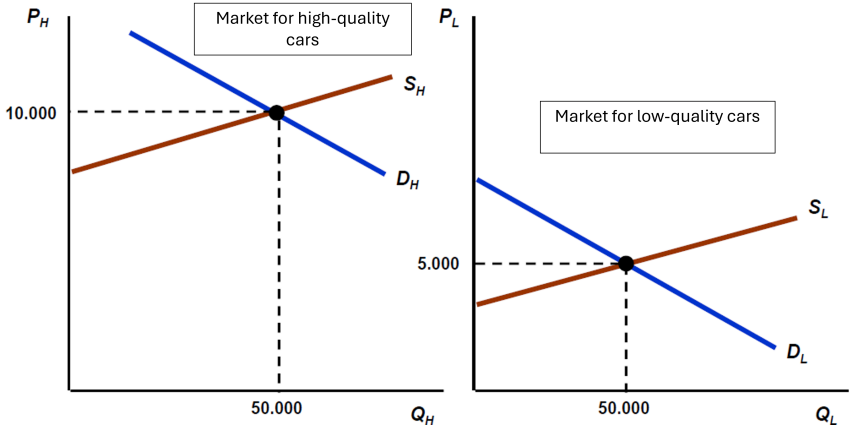
Suppose there are exactly 2 types of used cars: high-quality cars low-quality cars.

Scenario 1: Symmetric information

- Both the sellers and potential buyers can assess the quality of used cars flawlessly.
- If the price difference between good and bad cars is sufficiently large, some consumers prefer to buy a bad car rather than a good one.
- An equilibrium occurs where both good and bad cars are sold, and the price of a bad car is lower than that of a good car.

Adverse Selection

Scenario 1: Symmetric information



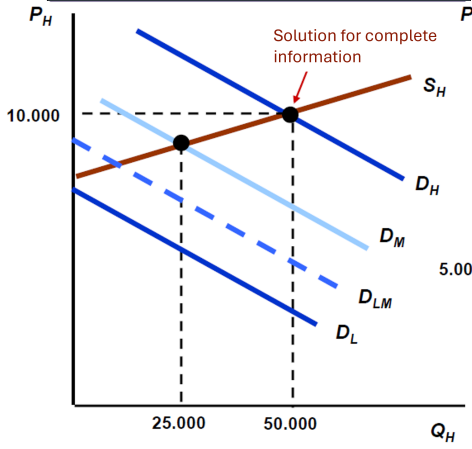
Adverse Selection

Let's suppose a seller has 1 high-quality and 1 low-quality car.
Scenario 2: Asymmetric Information

- Sellers know the car's quality; buyers do not.
  → Sellers want at least 5000 EUR for a good car, 1000 EUR for a bad one.
  → There is **one market** and **one price** for used cars.
- Assume 50% of cars are good.
  → Expected quality is 50% good, 50% bad.
  → Buyer values good cars at 6000 EUR, bad at 1000 EUR.
  → Willigness to pay: $WTP = 0.5 * 6000 + 0.5 * 1000 = 3500$ EUR.
  → Sellers won't sell good cars for 3500 EUR.
  → Buyers expect only bad cars at this price and reduce WTP to 1000 EUR.
  → Only bad cars sell for 1000 EUR.

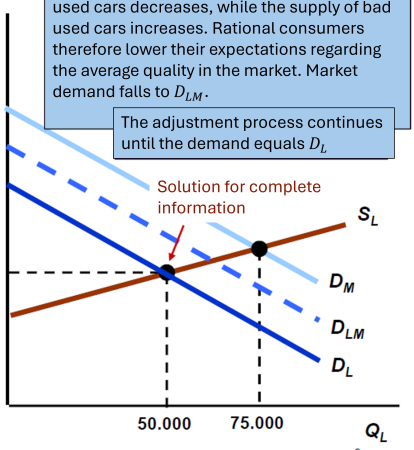
Adverse Selection

D_M: Demand curve when buyers believe that 50\% of the used cars offered are good.



If the demand curve is D_M, then (compared to symmetric information), the supply of good used cars decreases, while the supply of bad used cars increases. Rational consumers therefore lower their expectations regarding the average quality in the market. Market demand falls to D_{LM}.

The adjustment process continues until the demand equals D_L



9

Adverse Selection

Scenario 2: Market Failure due to Asymmetric Information

- Since sellers of good cars cannot signal their quality, good cars must be offered at a price reflecting the average quality.
- Some or all sellers of good cars may prefer to keep their good car.
- In extreme cases, only bad used cars are offered.
- Market failure: No trade of good used cars occurs, even though such trade would increase overall welfare.

Adverse Selection

Other examples:

- Market for used cars ("Lemons Problem")
- Credit lending
- Insurance markets

Ways to reduce the adverse selection problem:

- Development of reputation
- Standardization
- Certification by independent experts (or the government)
- Self-selection mechanism (screening) (Rothschild and Stiglitz, 1978)
- Signaling (Spence (1974), Nobel Laureate 2001)

Information Failures

- Information in markets is often undersupplied due to its public good nature.
- The government addresses this with labeling and disclosure regulations.
- Critics argue these regulations are costly and unnecessary.
- R&D spending is also undersupplied, as it is an investment in information.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

2. Failure of the Second Welfare Theorem

Unemployment, Inflation, and Disequilibrium

- Market failures are often revealed through periodic high unemployment and inflation.
- Despite moderation from World War II to 2008, unemployment still peaked at over 10% in 1982 and 2009.
- The national unemployment rate masks worse rates in specific regions and vulnerable populations.
- The global economic crisis in Europe led to record-high unemployment, exceeding 25% in some countries and 50% for youth.

Outline of Lecture 3

1. Failure of the First Welfare Theorem
1.1 Property Rights and Contract Enforcement
1.2 Failure of Competition
1.3 Public Goods
1.4 Externalities
1.5 Incomplete Markets
1.6 Information Asymmetry
1.7 Unemployment, Inflation, and Disequilibrium

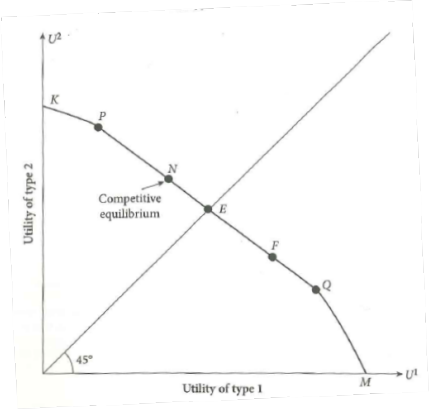
2. Failure of the Second Welfare Theorem

Failure of the Second Welfare Theorem

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

Assumptions:

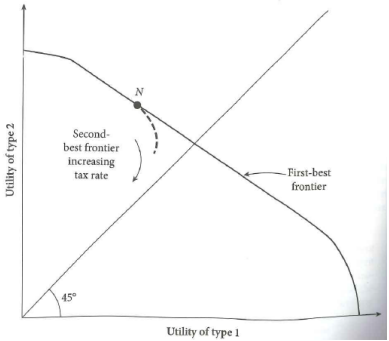
- First welfare theorem holds.
- Lump-sum transfers and taxes may be carried out costlessly.
  $\longrightarrow$ Government is able to identify initial wealth.



Atkinson and Stiglitz (2015) Figure 11-3
Utility possibility frontier

Failure of the Second Welfare Theorem

- **Impracticality of Redistribution:** The 2nd Welfare Theorem does not work in reality because initial endowments are unobservable by the government.
- **Distortionary Taxes:** Governments must use distortionary taxes and transfers based on observable economic outcomes (e.g., income or employment).
  $\longrightarrow$ Only second-best solutions are implementable.



Atkinson and Stiglitz (2015) Figure 11-5 Second-best and the utility possibility frontier

Illustration of the 2nd Welfare Theorem Fallacy

- **Hypothetical Case:** 50% disabled (earning \$0), 50% able (earning \$100).
- **Free Market Outcome:** Disabled have \$0, able individuals have \$100.
- **2nd Welfare Theorem Assumption:** Government is able to distinguish disabled from able (even if they don't work).
  - Taxes the able \$50, redistributes to the disabled (\$50 each).
  - Able keep working; otherwise, they earn \$0 but still pay \$50 in taxes.
- **Real World:** Government can't distinguish non-working able from disabled.
  - A \$50 tax on workers + \$50 transfer to non-workers destroys work incentives.
  - Able will not want to work and will become non-working able.

  $\longrightarrow$ Full redistribution becomes infeasible, leading to a trade-off between equity (shares of the pie) and economic efficiency (size of the pie).

Why Redistribute Wealth?

- Redistribution of wealth aims to reduce inequality and promote fairness in the distribution of resources.
- Example: Crusoe has 10 oranges, while Friday has only 2—this imbalance seems inequitable.
- However, redistribution comes with a trade-off: in the process of transferring 4 oranges from Crusoe to Friday, 1 orange is lost (perfect lump-sum transfers do not exist).
- This introduces a trade-off between **efficiency** (total resources) and **equity** (fairness in distribution).
- Public policy discussions often focus on this trade-off:
  - How much efficiency loss is acceptable to achieve more equity?
  - How should we balance the reduction of inequality with maintaining overall efficiency?

Readings for Next Week

4 Public Goods and Publicly Provided Private Goods

Main Reading: Stiglitz and Rosengard (2015) Chapter 5: Public Goods and Publicly Provided Private Goods

Thank you and see you next week!

Jonathan.Stabler@econ.muni.cz

References I

Atkinson, A. B. and Stiglitz, J. E. (2015). *Lectures on public economics: Updated edition*, Princeton University Press.

George, A. (1970). The market for lemons: Quality uncertainty and the market mechanism.

Mankiw, N. G. (2018). Intermediate macroeconomics (8th edition).

Rothschild, M. and Stiglitz, J. (1978). Equilibrium in competitive insurance markets: An essay on the economics of imperfect information, *Quarterly Journal of Economics* .

Spence, M. (1974). Competitive and optimal responses to signals: An analysis of efficiency and distribution, *Journal of Economic theory* **7**(3): 296–332.

Stiglitz, J. E. and Rosengard, J. K. (2015). Economics of the public sector (4th edition).