Public Economics
Lecture 6: Public Expenditures

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Outline of Lecture

1. Government Production of Private Goods
2. Government Failures and Inefficiencies
3. Research, and Technology
4. Health Care
5. Education

Reasons for Government Production of Goods

- Public Goods
- Positive Externalities
- Competition Failure (especially Natural Monopolies)
- Other Market Failures

Government Production of Private Goods

- Many private goods are produced by the government (e.g., postal service, utilities (water, electricity), schools, etc.)
  - Competition is not viable in these examples
  - Historically, one company has provided postal services or telephone services
    $\rightarrow$ Without government intervention, monopoly abuse
  - Government interventions:
    $\rightarrow$ Take charge of these private goods
    $\rightarrow$ Regulating the market
- In recent years, **privatization** of these goods
- But also **nationalization** in some parts of the world

Natural Monopoly

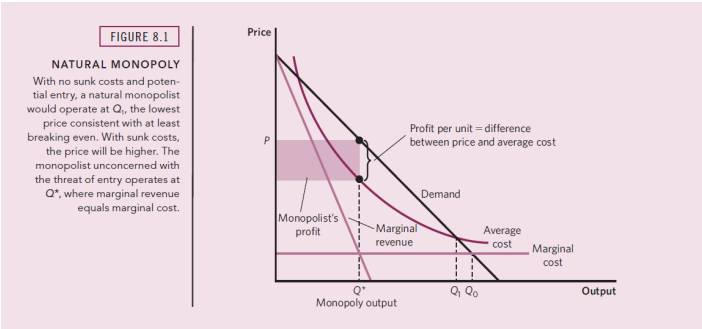
Examples: Postal services, telecommunications, water, harbors, electricity

Why Natural Monopolies Arise

- **Increasing Returns to Scale:** As production expands, **average costs decline**.
- Example: "The major cost of delivering water is installing the network of pipes. Once installed, additional costs to supply water to one more user are relatively insignificant."
- **Inefficiency of Duplicate Infrastructure:** Building additional, parallel networks (e.g., water pipes, power lines, gas networks) is inefficient and costly.

Key Insight: Natural monopolies justify public provision or regulation due to the inefficiencies of duplicate infrastructure and high fixed costs, as well as market power.

Natural Monopoly



Source: (Stiglitz and Rosengard, 2015)

- Private monopolist produces at Q^*, which is inefficient.
- Maximum viable output for monopolist is Q_1 (**zero profit point**), but why would she?
  - → **Subsidize** the monopoly, conditional on setting price at marginal cost ($p = MC$).
  - → **Public Ownership:** Government takes over the monopoly and produces at Q_1.

Regulation of Natural Monopoly

1. Government Subsidy Conditional on $p = MC$

- **Pros:**
  - \+ Consistent and efficient policy approach (*e.g., subsidy linked to locating in high-unemployment areas*).
  - \+ Knowledge generation about costs and benefits.
  - \+ Private firms remain more efficient (innovation, efficiency, etc.) even when subsidized.

- **Cons:**
  - – High transaction costs and administrative burden.
  - – Revenue generation for subsidies is expensive.
  - – Government needs precise subsidy estimation
    $\rightarrow$ Knowledge generation is costly.
  - – Risk of unanticipated market distortions.

Regulation of Natural Monopoly

2. Government Takeover to Produce Q_1

+ Enables production at the theoretically efficient quantity.
– Potential for government inefficiencies and failures.

3. No Government Intervention

+ Potential for efficient production by private monopolies.
– Results in high prices and low production quantities, which harms consumers.

Government Failures and Inefficiencies

Not only markets can fail in the efficient provision of private goods, but also the government. There are four reasons for the systematic failure of the government:

1. Limited information
   - Uncertainty about the types of companies and individuals
2. Limited control over private market responses
   - Market interventions can have many difficult to foresee consequences
3. Limited control over bureaucracy
4. Limitations imposed by political processes
   - Elections/ public opinion
   - Lobbying/ conflicts of interests

Most countries have devised political processes to enhance public sector efficiency.

The Evolving Consensus on Government's Role in Production

- **Limited Role for Government in Production**: Increasing consensus that government should avoid producing private goods, but retain control over essential public functions (e.g., national defense).
- **Debate on Privatization vs. Public Provision**: Key concerns include efficiency, access, and maintaining public objectives; controversial areas include prisons, welfare, education, and utilities.
- **Challenges of Privatization**:
  - Potential rise in prices if hidden subsidies are removed.
  - Concerns over loss of public focus and potential exploitation (e.g., Health Care).
- **Alternative Models**: Public-Private Partnerships (PPPs), corporatization, and regulated competition may offer balanced solutions.

Public-Private Partnerships (PPPs)

- **Definition**: Collaborative agreements where government and private sector jointly fund, build, or operate public services/infrastructure.
- **Purpose**: Leverage private sector efficiency and capital with public sector oversight to deliver essential services.

Examples: Toll roads, hospitals, schools, water treatment plants.

Corporatization

- **Definition**: Transforming public entities into independently managed corporations but owned by the public sector.
- **Purpose**: Allows government services (e.g., utilities, postal services) to operate under business-like models while still being publicly owned.

Examples: BBC (British Broadcasting Corporation), Deutsche Bahn, United States Postal Service (USPS), etc.

Outline of Lecture

Research and Technology

Knowledge as a Public Good

- Not desirable (and difficult) to exclude anyone (because of positive externalities): Non-exclusion.
- Non rivalrous: The 'consumption' of knowledge does not hinder anyone else's consumption.
- And high investment costs.

$\Longrightarrow$ Market failures in RD (underprovision).

Solutions

- Assign Intellectual Property Rights to ensure compensation for knowledge creation.
- Government involvement in knowledge production.

Intellectual Property Rights

The government establishes *property rights* in knowledge by granting:

Patents

- Exclusive use of knowledge.
- Right to license use for a limited period.

Copyrights

- Exclusive right to use and market their own written works.

$\Longrightarrow$ Ensures inventors and authors can profit from their (knowledge) creations.

Duration of Patents: A Trade-off

+ **Incentives for R&D:** Longer patent protection encourages firms to invest in research and development.
– **Inefficient Use:** Extended patents can lead to inefficiencies as other firms are excluded, resulting in higher marginal costs (C_0).

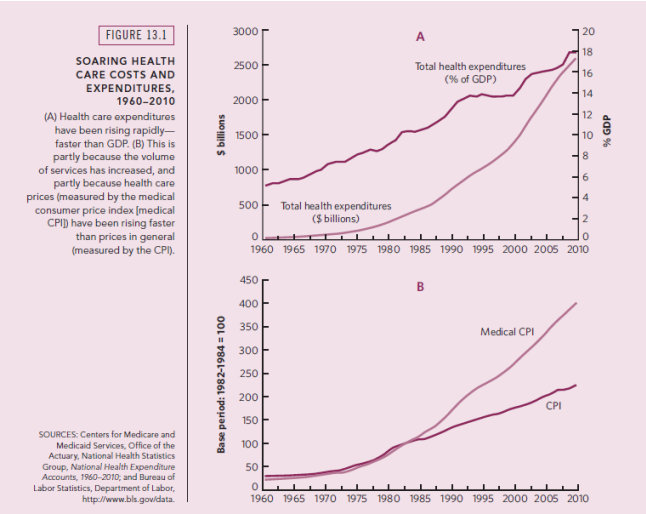
Direct Government Involvement in Knowledge Production

Government directly funds research activities.

1. Basic research
   - Adds to our underlying score of fundamental knowledge (as opposed to applied research, which is intended to produce new products or manufacturing techniques).
   - Often underprovided in the private market due to lack of direct monetary profits.
   - Very important as an input to the production of other knowledge (large positive externality)
2. Applied research and industrial policies
   - \+ Also generates large spillovers contributing to additional knowledge creation.
   - − Government intervention in choosing "important" industries can be controversial.

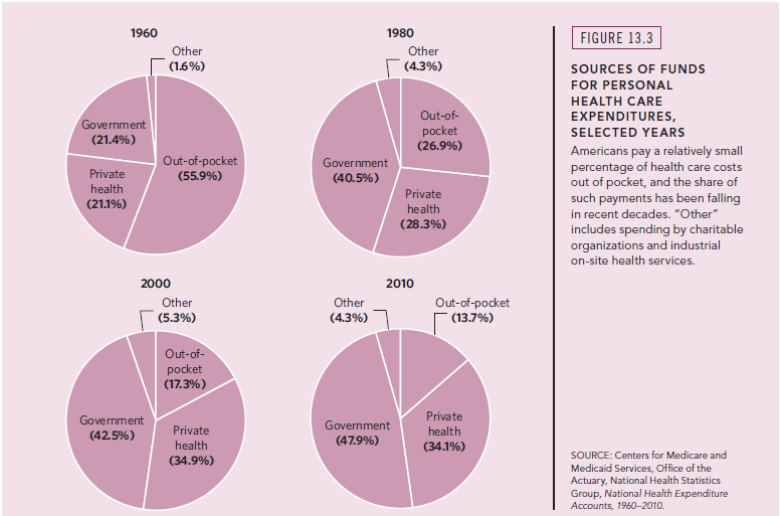
Outline of Lecture

Health Care



Source: Stiglitz and Rosengard (2015)

Health Care



Source: Stiglitz and Rosengard (2015)

Rationale for a Role of Government in the Health Care Sector

1. Imperfect Information
2. Limited Competition
3. Absence of Profit Motive
4. Transaction Costs

Imperfect Information

Medical care is a **credence good**: *"goods or services whose qualities are not perfectly identified even after their purchase"*

- Difficult to determine the quality of a doctor's judgement, especially because medical care is not a frequent service.
- Reputation and rating mechanism difficult to establish.
- Imperfect information about patients creates the problem of **adverse selection**.

Solution: Government licenses doctors and regulates the administered drugs.

Limited Competition

Imperfect information creates limited competition:

- Lower prices of one doctor may give the signal that she is not a good doctor.
- Medical services are individual and heterogeneous.
  $\rightarrow$ difficult to compare services.
- In many countries, doctors are not allowed or restricted in their advertising activities.
- Distance to or availability of medical service (e.g., a hospital) usually dictates the choice and not quality.

$\Longrightarrow$ Due to those difficulties, there can not be perfect competition in the health care sector.

Absence of Profit Motive

The goal of medical care is to help patients and not to make a profit.

- Many hospitals are not for profit but for treating health conditions and saving lives.
- Free market incentives can create *perverse* incentives to lower the quality of medical care.
- Especially because health care is a credence good.

Transaction Costs

- Private insurances spend a lot of time and effort identifying the risk of an individual.
- Individuals need to choose their optimal insurance policy.
- Hospitals and doctors need to figure out which insurance pays what.
- A government run and standardized insurance policy could reduce such transaction costs.

Moral Hazard of Insurance

The insurance industry distinguishes between two types of risks:

1. **Objective risk** is the risk that cannot be influenced by individuals.
2. **Moral risk (moral hazard)** is the risk, which the insured person can influence by influencing the probability and the severity of a harm.
   - Without insurance: individual invests into 'caution' until the marginal benefit of caution equals its benefit.
   - With insurance: the marginal benefit of caution is lower because one gets compensated in case of a harm.
     $\rightarrow$ Beneficial to invest less in caution.
     $\rightarrow$ With excessive insurance, individuals are less careful.
     $\rightarrow$ Does this really apply when it concerns one's health?

Moral Hazard of Insurance

Solutions: Own deductibles (or own risks), where patients pay out of the own pocket until a specific amount.

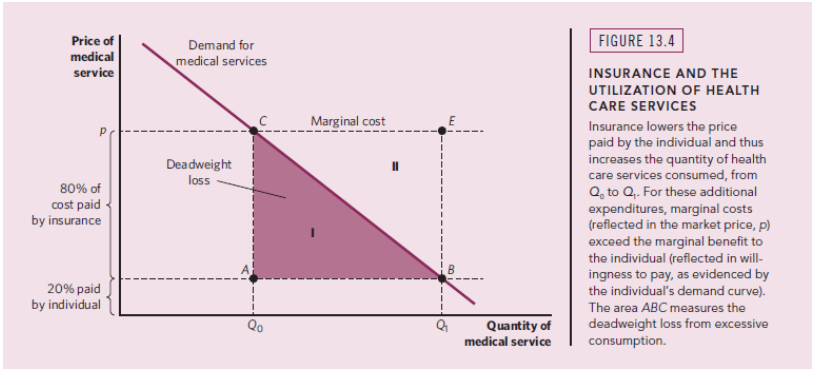


FIGURE 13.4

INSURANCE AND THE UTILIZATION OF HEALTH CARE SERVICES

Insurance lowers the price paid by the individual and thus increases the quantity of health care services consumed, from Q_0 to Q_1. For these additional expenditures, marginal costs (reflected in the market price, p) exceed the marginal benefit to the individual (reflected in willingness to pay, as evidenced by the individual's demand curve). The area ABC measures the deadweight loss from excessive consumption.

Source: Stiglitz and Rosengard (2015)

Adverse Selection

Oftentimes, individuals are better informed about their own insurance risk (general health condition, risk of accidents, etc.) than the insurance firm.

Example: Insurance Premium

- Suppose individuals have either a high risk (type H) or low risk (type L)
- $\frac{3}{4}$ of the population are of type H, and $\frac{1}{4}$ of type L
- Wealth w of individuals is 1000 EUR
- A health issue leads to a loss of 400 EUR
- Probability of a health issue is $\frac{3}{4}$ for the high type and $\frac{1}{4}$ for the low type
- Utility function of an individual $U(w) = \sqrt{w}$

Adverse Selection

Symmetric information: Insurance company knows the risk type and can make discriminate offers.

- The fair insurance premium for each type:
  - $\frac{3}{4} * 400 = 300$ for types H
  - $\frac{1}{4} * 400 = 100$ for types L
- Risk-neutral insurance company + perfect competition on the free insurance market lead to fair insurance premiums
- Consumers are risk-averse (as $U(w) = \sqrt{w}$), hence they want to pay such an insurance premium

$\rightarrow$ No market failure in this case

Adverse Selection

Asymmetric information: Insurance company cannot discriminate between individuals and has to offer everyone the same premium and price.

- The fair insurance premium (from the view of the firm) if everyone gets the same contract:

$$\underbrace{\frac{3}{4}}_{\text{risk of H}} \underbrace{\frac{3}{4}}_{\text{proportion H}} 400 + \underbrace{\frac{1}{4}}_{\text{risk of L}} \underbrace{\frac{1}{4}}_{\text{proportion L}} 400 = 250$$

- Types H want to buy this insurance as:

$$\underbrace{\frac{1}{4}\sqrt{1000} + \frac{3}{4}\sqrt{1000-400}}_{\text{expected utility without insurance}} \approx 26.28 < \underbrace{\sqrt{1000-250} \approx 27.39}_{\text{expected utility with insurance}}$$

- Yet, Types L don't want to buy this insurance:

$$\underbrace{\frac{3}{4}\sqrt{1000} + \frac{1}{4}\sqrt{1000-400}}_{\text{expected utility without insurance}} \approx 29.84 > \underbrace{\sqrt{1000-250} \approx 27.39}_{\text{expected utility with insurance}}$$

Adverse Selection

Only high types H buy the insurance for 250 EUR.

- Not profitable for insurance company because only high types H buy the insurance and expected payoff for the firm is now:

$$\frac{3}{4}400 - 250 = -50$$

- Hence, the insurance will have to increase the price to 300 EUR.
- In our scenario, still profitable for high types to get insured
  $\rightarrow$ Yet, inefficient outcome as low types don't get insured
  $\rightarrow$ Would be welfare improving if low types also get insured because they are risk averse and the insurance companies risk neutral.
- Additionally, with other parameters, it might be that high types will not want to insure themselves anymore and nobody gets insured (**market breakdown**).

Adverse Selection

Adverse selection is a problem for a private health insurance market:

- If the insurance premium is calculated based on the entire population, it is not profitable for the healthiest to get insured.
- The average health per insured person decreases.
- The insurance premium increases.
- More healthy individuals leave the insurance.
- The insurance premium increases ever more.
- And so on.

Adverse Selection – Countermeasures

Private insurance companies try to gather information about individuals types.

- Give different insurance premiums to different types conditional on 'pre-existing conditions' of the individual or family history conditions, work conditions, or lifestyle.
- Do not provide insurance for 'pre-existing conditions' (illegal in many countries).
- Limits on the extent of coverage (illegal in many countries).
- **Screening:** Offer many different insurance premiums and let individual select themselves into the insurance and (partially) reveal their type (see Rothschild and Stiglitz (1978)).

Mandatory public health insurance for everyone.

Outline of Lecture

Education

Why is education publicly provided and publicly financed, as education is not a pure public good?

1. Positive externalities:
   - A highly educated society "functions" better.
   - Spillovers to research and development.
   - Public schools help with integration of immigrant groups.

   $\rightarrow$ Free market does not account for these positive externalities.

   $\rightarrow$ Undersupply of education on the free market.
2. Education should not depend on wealth or risk preferences.
   - Equality of opportunities.
   - Distributional concerns.

   $\rightarrow$ On the free market, financially poor individuals/ families have to get into debt.

Education Outcomes

- Education as investment in human capital.

→ Increases future wages (and productivity) of individuals.

- Education as a **signaling** device. (Spence, 1974)

→ Having completed a decree sends a signal to companies about the ability of a worker.

→ Going longer to school does not (only) make you smarter but shows your ambition and drive.

→ Human capital is more efficiently used.

Other Public Expenditures

- Defense (Chapter 12, Stiglitz and Rosengard, 2015)
  $\rightarrow$ Classic example for a pure public good (non-rivalry and non-excludability).
- Welfare programs (Chapter 15, Stiglitz and Rosengard, 2015)
  $\rightarrow$ Transfer of cash and consumption goods to the poor.
- Social insurance (Chapter 16, Stiglitz and Rosengard, 2015)
  $\rightarrow$ Pension funds, unemployment insurance, inability to work insurance, etc.

Readings for Next Lecture

Lecture 7: Taxation I (28th of November)

Main Readings: Stiglitz and Rosengard (2015)

- Chapter 17: Introduction to Taxation
- Chapter 7: Efficiency and Equity (p. 163-172)

Main Readings: Mankiw (2018)

- Chapter 12: The Design of the Tax System

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

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