ECONOMICS Lecture 25
Market Efficiency & Failure

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Topics

- General Equilibrium
- Market Efficiency
- Market Failures
- Coase Theorem

This lecture formalizes the concept of economic efficiency in production, exchange, and public policy; introduces four notorious cases which result in market "failure"; and clarifies the confusion and misunderstanding on the nature of the market from the insight of the Coase Theorem.

https://www.proximgroup.com.au/process-improvement-consulting/

Market Equilibrium Analysis

- Demand, supply, and market equilibrium analysis is a gift from Alfred Marshall since his 1890 publication of the Principles of Economics .

- Partial equilibrium analysis: Determination of equilibrium prices and quantities in a market independent of effects from other markets.

- General equilibrium analysis: Simultaneous determination of the prices and quantities in all relevant markets, taking feedback effects into account. A feedback effect is a price or quantity adjustment in one market caused by adjustments in related markets.

- In practice, a complete general equilibrium analysis, which evaluates the effects of a change in one market on all other markets, is not feasible. Instead, we confine ourselves to two or three markets that are closely related. For example, when looking at a tax on oil, we might also look at markets for natural gas, coal, and electricity.

Stock Market Co-movements
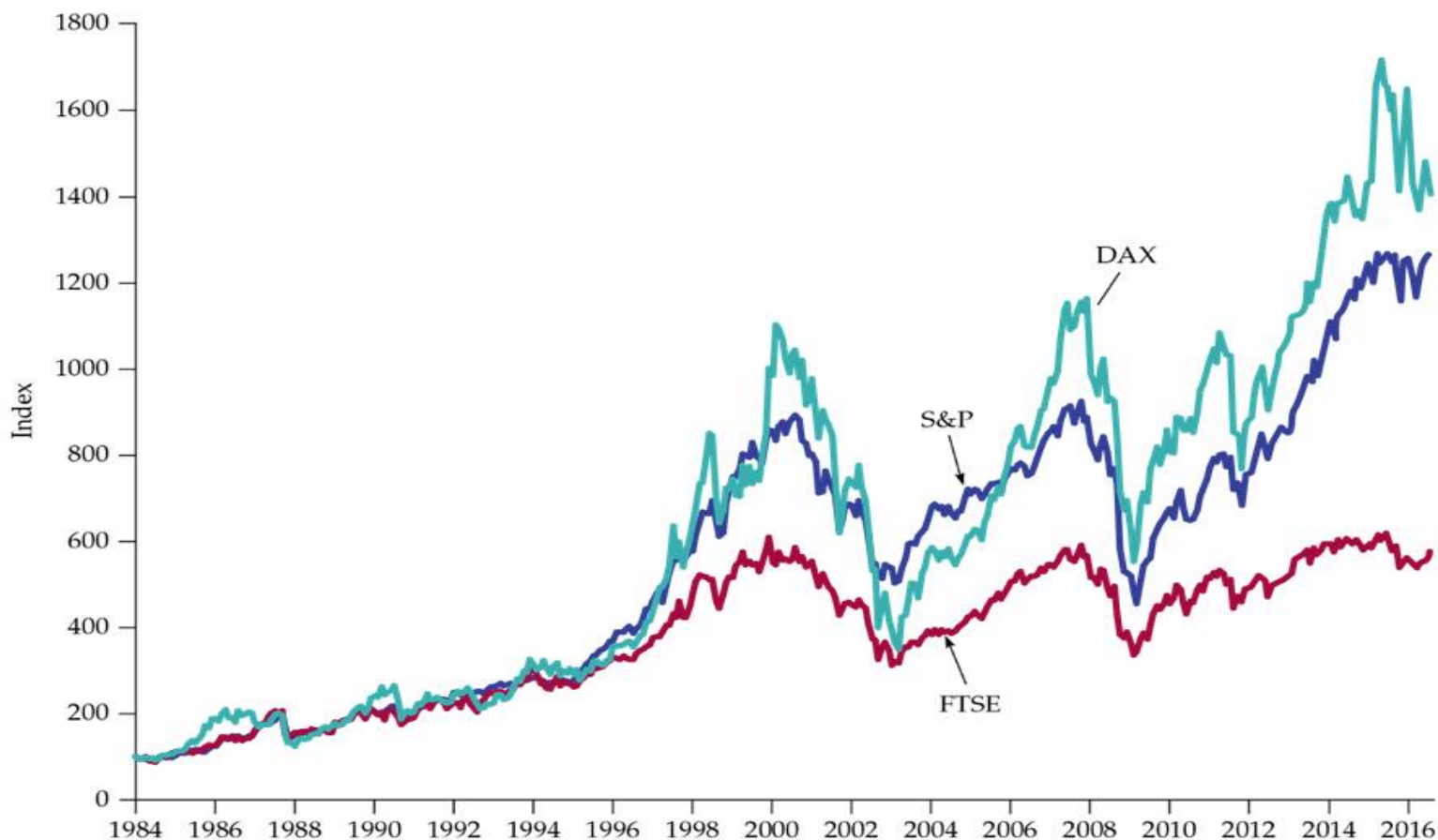
Three stock market indices—the S&P 500 in the United States, the FTSE in the United Kingdom, and the DAX in Germany—are plotted together, scaled so that each starts at 100 in 1984. The indices tend to move together, increasing and decreasing at about the same time.

Pindyck & Rubinfeld, CH16, Microeconomics, 9th edition. Pearson.

Global Market for Ethanol

- The world ethanol market is dominated by Brazil and the United States, which accounted for over 90 percent of world production in 2005.

- If U.S. tariffs on ethanol produced abroad were to be removed, Brazil would export much more ethanol to the U.S., displacing much of the more expensive corn-based ethanol produced domestically.

- As a result, the price of ethanol in the U.S. would fall, benefiting U.S. consumers.
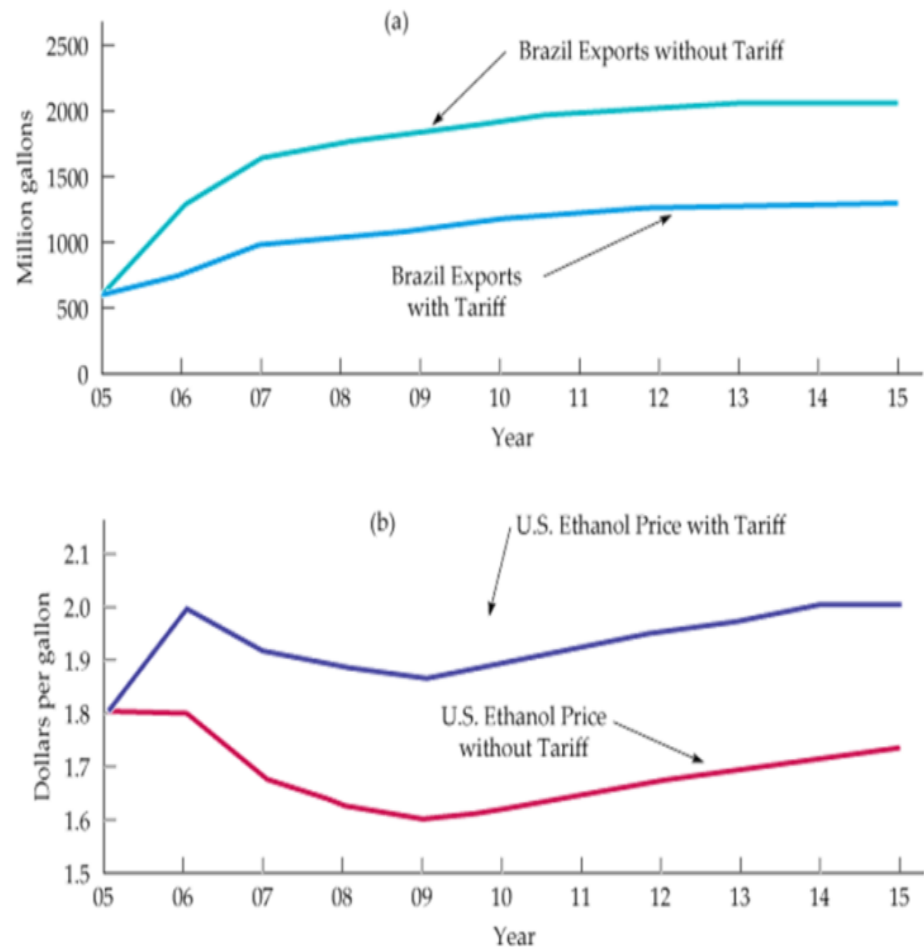
Social Competition & Efficiency

- In the lecture on Scarcity and Competition, we study the nature of resource allocation via various forms of social competition.

- **Competitive criterion determines winners and losers. Rules of the game ensures equity and efficiency.**

- Which type of competition can lead to highest level of economic prosperity and public welfare, benefiting all in the society? What are the corresponding rules of the game?

- **Economic Efficiency** is a relationship between ends and means. Implied by rationality, it means maximizing benefit at a minimum cost. When applied to a competitive market, the term economic efficiency refers to a market that maximizes aggregate consumer and producer surplus. Any deadweight loss indicates inefficiency.

Pareto Efficiency and Social Welfare

- **Welfare Economics:** normative evaluation of markets & public policies.

- **Pareto Efficiency/Optimality**: an allocation of resources in which the goods cannot be reallocated without making any individual worse off.

- In a Pareto efficient allocation of goods, no one can be made better off without making someone else worse off (no Pareto improvement exists).

- Note that there is an equity implication of Pareto efficiency. It may be possible to reallocate the goods in a way that increases the total well-being of the society, but leaves one individual worse off. In this case, the society improves efficiency but lacks equity. Public policy plays its role in striking a balance between efficiency and equity. A bigger pie or equal shares.

- Redistributive public policy has the potential to ensure a bigger pie and then compensate for the "losers" to improve their welfare.

Market Equilibrium and Welfare
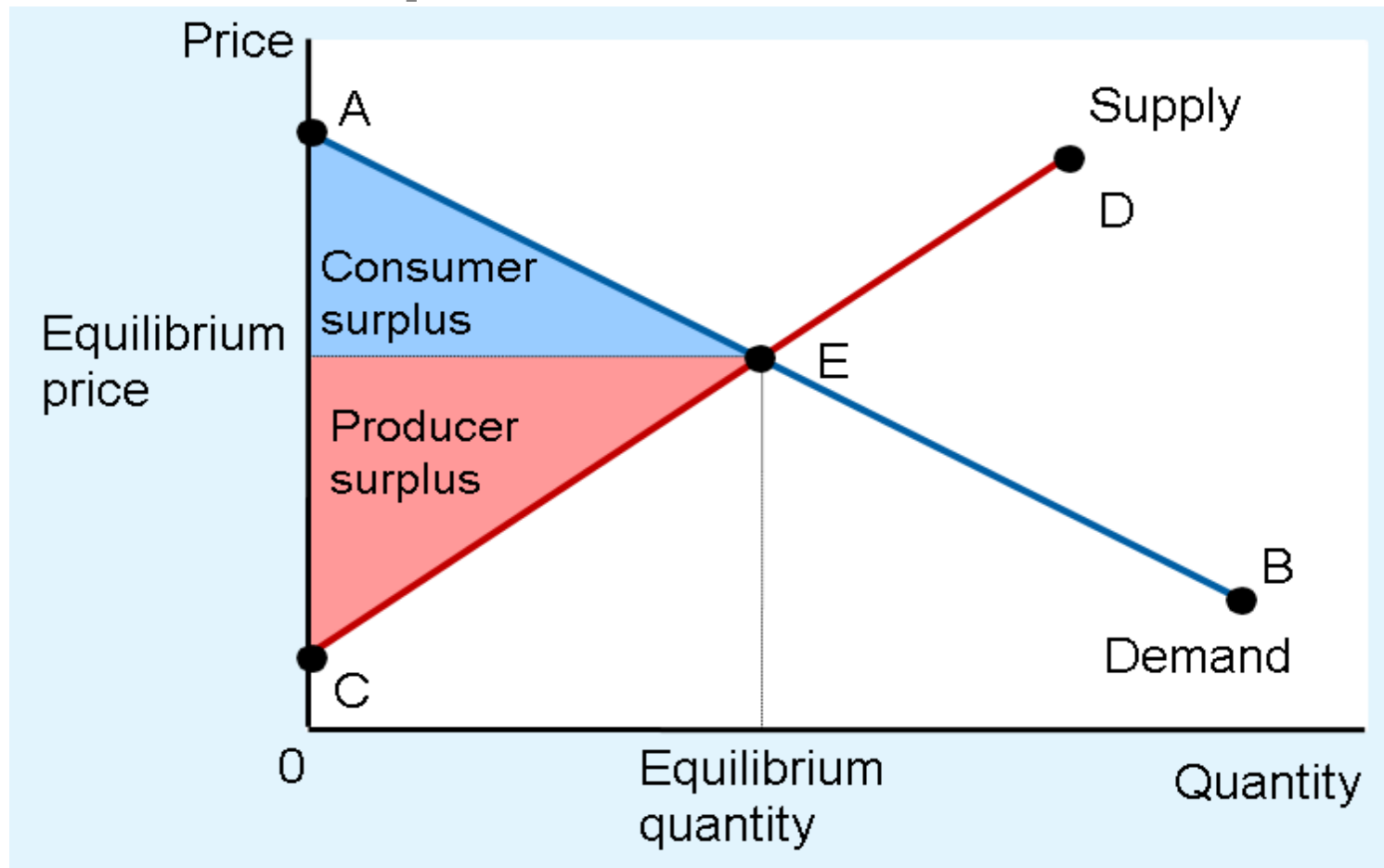
- In equilibrium, social surplus = consumer surplus + producer surplus
- In equilibrium, market welfare is maximized for a combination of P & Q.

Economic Efficiency: Exchange

- Exchange economy: Market in which two or more consumers trade two goods among themselves.

- In a competitive market, the prices of the two goods determine the terms of exchange among consumers.

- **Exchange Efficiency**: a Pareto efficient allocation of a set of goods (i and j) across all individuals (A and B).

- Mathematically, $MRSij^A = MRSij^B = Pi/Pj$.

- A equilibrium is a set of prices at which the quantity demanded equals the quantity supplied in every market. This is also a competitive equilibrium because all suppliers and demanders are price takers. The market is in disequilibrium when the quantities of food and clothing demanded are not equal to the quantities supplied. This disequilibrium should be only temporary.

Economic Efficiency: Production

- Input efficiency: a Pareto efficient allocation of input factors (i and j) across all producers (A and B).

- The production possibilities frontier PPF shows all efficient combinations of outputs. Marginal rate of transformation (MRT): Amount of one good that must be given up to produce one additional unit of a second good. The opportunity cost of producing a good in term of the other.

- The PPF is concave because its slope (the MRT) increases as the level of production of food increases.

- **Production efficiency**: a combination of outputs that simultaneously supports exchange and input efficiency.

- Mathematically, $MRT = MP_i / MP_j = MRS = P_i / P_j$.

Production & Exchange Efficiency

The efficient combination of outputs is produced when the marginal rate of transformation between the two goods (which measures the cost of producing one good relative to the other) is equal to the consumer's marginal rate of substitution (which measures the marginal benefit of consuming one good relative to the other).
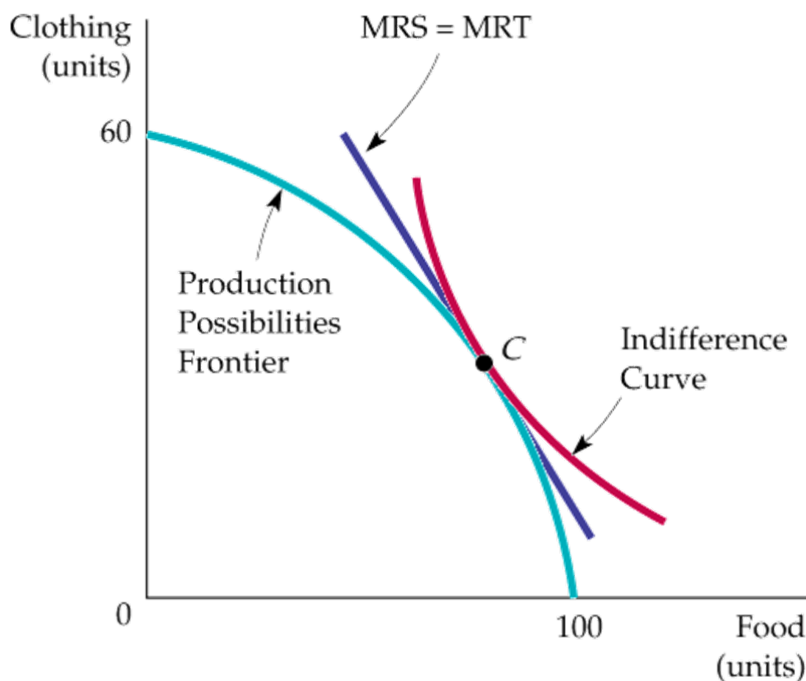
Production & Exchange Efficiency

In a competitive output market, people consume to the point where their marginal rate of substitution is equal to the price ratio.

Producers choose outputs so that the marginal rate of transformation is equal to the price ratio.

Because the MRS=MRT, the competitive output market is efficient. Any other price ratio will lead to an excess demand for one good and an excess supply of the other.
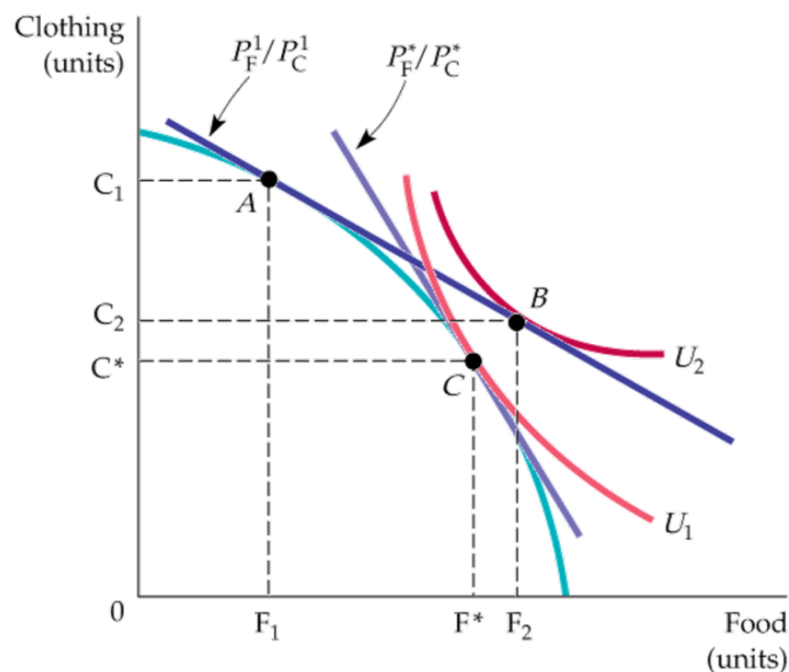
Economic Efficiency: Taxation

- The principle of marginal equalization results from optimizing objective function. In theory, social welfare function guides the trade-off between equity and efficiency in optimal policy design.

- In practice, the governments may face certain constraints in achieving its optimal taxation policy (e.g., the budget limit).

- Optimal income tax: choose the tax rates across income groups to maximize social welfare subject to a level of government revenue.

- Optimal consumption tax: choose the tax rates across goods to minimize DWL for a given government revenue constraint.

- **Ramsey Rule**: To minimize the DWL while raising a fixed amount of revenue, taxes should be set so that the ratio of the marginal deadweight loss to marginal tax revenue is equal across all commodities i and j: $MDWL_i / MR_i = MDWL_j / MR_j$

Nobel Prize for Welfare Economics

- 1970 Paul A. Samuelson "for the scientific work through which he has developed static and dynamic economic theory and actively contributed to raising the level of analysis in economic science"

- 1972 John R. Hicks and Kenneth J. Arrow "for their pioneering contributions to general economic equilibrium theory and welfare theory"

- 1975 Leonid Vitaliyevich Kantorovich and Tjalling C. Koopmans "for their contributions to the theory of optimum allocation of resources"

- 1983 Gerard Debreu "for having incorporated new analytical methods into economic theory and for his rigorous reformulation of the theory of general equilibrium"

- 1988 Maurice Allais "for his pioneering contributions to the theory of markets and efficient utilization of resources"

- 1998 Amartya Sen "for his contributions to welfare economics"

- 2015 Angus Deaton "for his analysis of consumption, poverty, and welfare"

https://www.nobelprize.org/prizes/lists/all-prizes-in-economic-sciences/

First and Second Welfare Theorem

- There are two fundamental theorems of welfare economics.

- **First fundamental theorem**: any competitive equilibrium leads to a Pareto efficient allocation of resources. It is also known as the "Invisible Hand Theorem." The main idea here is that markets lead to social optimum. Thus, no intervention of the government is required, and it should adopt only "laissez faire" policies.

- **Second fundamental theorem**: any efficient allocation can be attained by a competitive equilibrium, given the market mechanisms leading to redistribution. This theorem is important because it allows for a separation of efficiency and distribution matters. Those supporting government intervention will ask for wealth redistribution policies.

https://policonomics.com/fundamental-theorems-of-welfare-economics/

Market Inefficiency and Failure

- One of the major functions of the market economy is to allocate resources and distribute income in a way that consumers and producers value most highly based on cost-benefit optimization.

- However, market economy and price system is not the only way to achieve such desirable outcome. Transaction costs in the market economy are costly, and sometimes prohibitive, including legal/administration/contracting cost/enforcement/information cost.

- On the other hand, according to mainstream views, markets are sometimes said to produce too much or too little of certain products and thus fail to make the most efficient use of society's limited resources, hence **Market Failure**. The misunderstanding is prevalent in the evolution of economic thought and public policy designs.
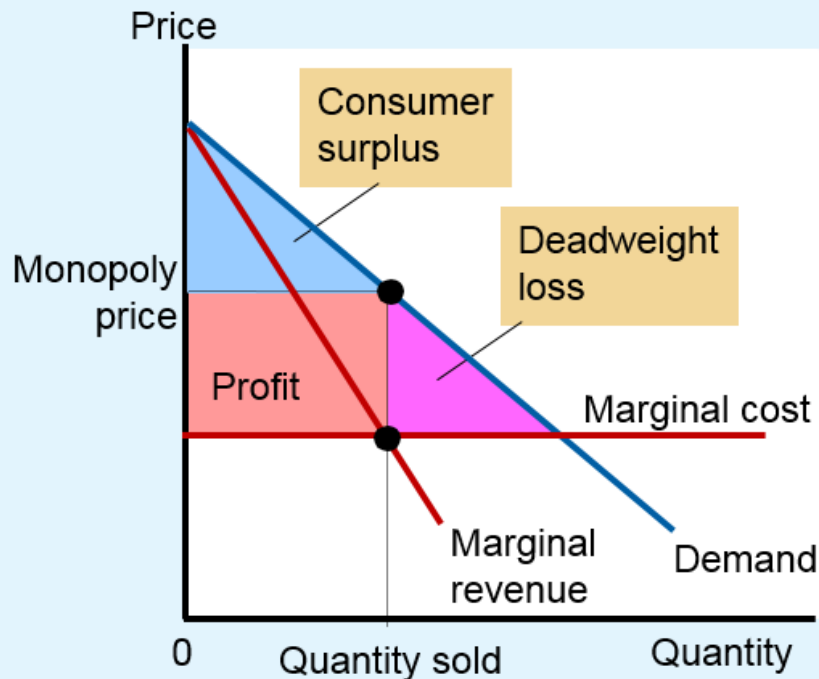
The Big Four "Market Failures"

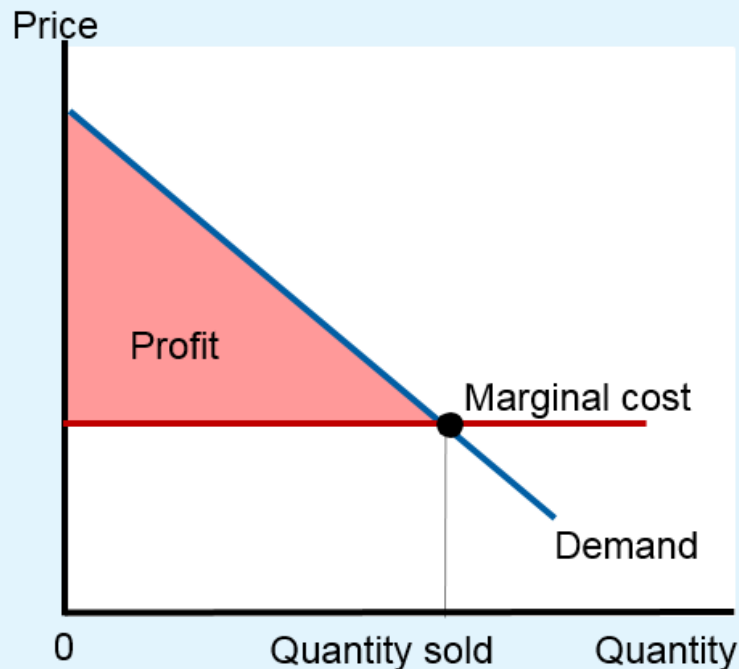In almost all economic textbooks, there are four mkt failures:

- **Market Power:** monopoly (single seller), monopsony (single buyer), and natural monopoly (when the cost structure of the industry makes it more efficient for a single firm to produce the entire market's output)

- **Externalities:** uncompensated costs or benefits that spill over onto people who are not party in a transaction.

- **Public Goods:** non-rival in consumption and for which it is prohibitively costly to exclude non-payers or free-riders.

- **Asymmetric Information:** overpricing, market disappear, and lemons (adverse selection and moral hazard).

Monopoly Inefficiency: Deadweight Loss

(a) Monopolist with Single Price

Price

Consumer surplus

Deadweight loss

Monopoly price

Profit

Marginal cost

Marginal revenue

Demand

0   Quantity sold   Quantity

(b) Monopolist with Perfect Price Discrimination

Price

Profit

Marginal cost

Demand

0   Quantity sold   Quantity

Panel (a) shows a monopoly that charges the same price to all customers. Total surplus in this market equals the sum of profit (producer surplus) and consumer surplus.

Panel (b) shows a monopoly that can perfectly price discriminate. Consumer surplus equals zero and total surplus now equals the firm's profit. *"What a sin against the public!"*

Economic Nature of Goods

- Goods can be classified according to two attributes:
  - whether they are excludable
  - whether they are rival in consumption
- A good or service is excludable if the suppliers of that good can prevent people who do not pay from consuming it.
- A good or service is rival in consumption if the same unit of the good cannot be consumed by more than one person at the same time.
- Most goods can be produced efficiently and consumed in a competitive market. But some goods cannot.

Private vs Public Goods

	Rival in consumption	Nonrival in consumption
Excludable	**Private goods** • Wheat • Bathroom fixtures	**Artificially scarce goods** • On-demand movies • Computer software
Non-excludable	**Common resources** • Clean water • Biodiversity	**Public goods** • Public sanitation • National defense

Krugman & Wells, Economics, 5th edition. Macmillan.

Public Goods: Examples

Public goods are also known as **collective consumption goods**

Why healthcare is NOT a public good
Healthcare has the characteristics of a private good because is rival and excludable in consumption

Sanitation infrastructure

Flood defence / tidal barrage

Crime control for a community

Reduced risk of disease from vaccinations

Freely available knowledge e.g. online learning

Public service broadcasting

https://www.tutor2u.net/economics/reference/public-goods

Tragedy of the Commons

- A common resource isn't a public pure good due to non-excludability.

- In modern economic context, "commons" is taken to mean any shared and unregulated resource such as atmosphere, oceans, rivers, ocean fish stocks, or even an office refrigerator.

- Although common resource systems have been known to collapse due to overuse (such as in over-fishing), many examples have existed and still do exist where members of a community with access to a common resource co-operate or regulate to exploit those resources prudently without collapse.

- Elinor Ostrom was awarded the 2009 Nobel Prize in Economics for demonstrating exactly this concept in her book Governing the Commons, which included examples of how local communities were able to do this without top-down regulations or privatization.

https://en.wikipedia.org/wiki/Tragedy_of_the_commons
https://www.dummies.com/education/science/environmental-science/ten-real-life-examples-of-the-tragedy-of-the-commons/

Public Goods: Free Rider Problem

- Goods that are nonexcludable suffer from the free-rider problem: individuals have no incentive to pay for their consumption and instead will take a "free ride" on anyone who does pay.

- Public goods are also nonrival in consumption, more than one person can consume the same unit of the good at the same time.

- A rationale for the existence of government is that no individual has an incentive to pay for providing the efficient quantity of a public good because each individual's marginal benefit is less than the marginal social benefit. The most important public goods are paid for with taxes.

- The marginal social benefit of an additional unit of a public good is equal to the sum of each consumer's individual marginal benefit from that unit. At the efficient quantity, marginal social benefit equals the marginal cost. However, consumers avoid to reveal their true preference and pay.

Individual Choice & Social Effects

- Individuals will incur external effects on the society in their decision making processes, regardless of their intentions.

- Externality refers to the net social effects of private decisions.

- "Good effects" examples: education makes the consumer a more productive worker who earns higher wages. A well educated population leads to more informed voters, tends to result in lower crime rates, and may encourage the development and dissemination of technological advances, leading to higher productivity and wages for everyone.

- "Bad effects" example: though production of goods and services is beneficial to the producers and consumers, firms can cause pollution to the environment (air, water, noise, etc..).

Positive Externalities

Examples of external benefits:

- *Internet*
- *Education*
- *Sanitation*
- *Lighthouse*
- *Preserved farmland*
- *Public infrastructure*
- *Shopping center / mall*
- *Beehives next to almond orchards / pollination*
- *Industrial clusters / networks*

Negative Externalities

Examples of external costs:

- *Traffic congestion*
- *Rumors and gossips*
- *Endemic and pandemic*
- *Air and water pollution*
- *Texting while driving*
- *Construction/airport noises*
- *Bank runs and financial market panics*
- *Chemical runoff that affects fish stocks*
- *CO_2 emission and global warming*
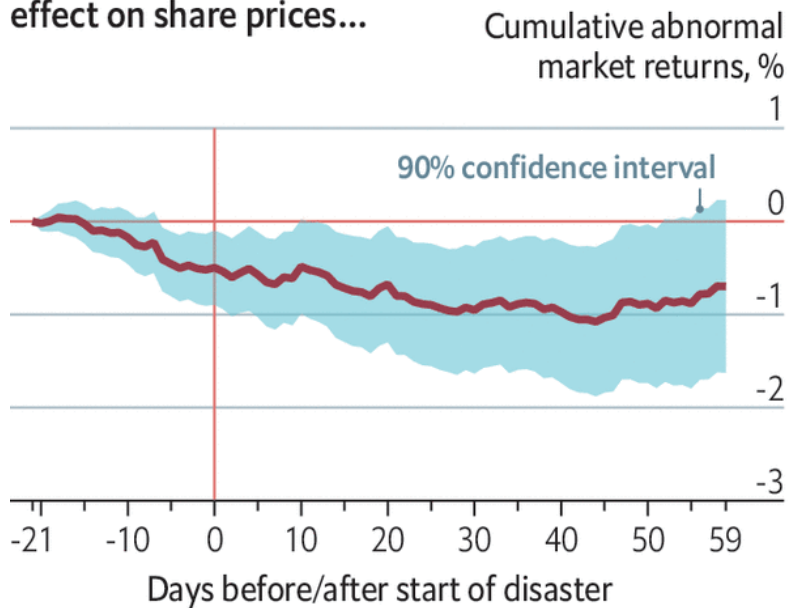
Externality Inefficiency

- Negative externality: when social cost is greater than private cost of private action. Social cost=private cost + external cost.

- Positive externality: when social benefit exceeds private benefit of the private action. Or, external benefit of a private action is positive. Social benefit=private benefit + external benefit.

- When negative externality exists, the action is considered as "overdosed" and should be reduced; when positive externality occurs, the action is considered as insufficient and should be encouraged. What can be done to solve externality problems?

- Market is said to fail in handling externality problem due to divergence between reality and myth. Conventional wisdom suggests government intervention.

Climate Risk & Stock Market Valuation

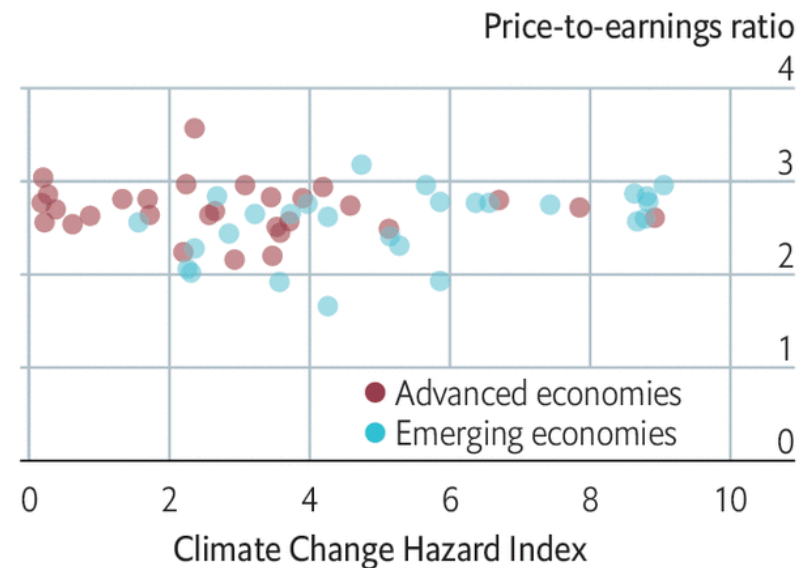**Calm before the storm**
Climatic disasters and share prices

Climatic disasters* have a modest effect on share prices...

Cumulative abnormal market returns, %

90% confidence interval

Days before/after start of disaster

Source: IMF

...and there is no relationship between climate risk and equity valuations

Price-to-earnings ratio

● Advanced economies
● Emerging economies

Climate Change Hazard Index

*In 68 countries, 1980–2018

The Economist

Asymmetric Information Failure

- Asymmetric information, also known as "information failure," occurs when one party to an economic transaction possesses greater material knowledge/information than the other party.

- Many markets are characterized by asymmetric information: actors on one side of the market have much better information than those on the other. Borrowers know more than lenders about their repayment prospects, managers and boards know more than shareholders about the firm's profitability, and prospective clients know more than insurance companies about their accident risk.

- Asymmetric information can result in two problems in the markets.

- Adverse selection (ex ante): low-quality or lack of transaction.

- Moral hazard (ex post): excessive risk-taking or "immoral" behavior.

https://www.nobelprize.org/prizes/economic-sciences/2001/press-release/

Asymmetric Information: Examples

Risks from using tanning salons

Addiction to painkillers & other drugs

Gaining entry to elite degree courses

Complexity of pension schemes

Uncertain quality of second hand products

Knowledge of the nutritional content of foods

Cowboy builders or other "rip-off merchants"

Tourist Bazaars or buying and selling antiques

https://www.slideshare.net/tutor2u/tutor2u-market-failure-information-failures

The Coase Theorem

- In an influential 1960 article, "The Problem of Social Cost," the economist Ronald Coase pointed out that in an ideal world when transaction cost is low enough, the private sector could indeed deal with all externalities.

- According to the **Coase theorem**, even in the presence of externalities and in the provision of public goods, individual market participants are aiming to and can reach an efficient outcome provided that the transaction costs are sufficiently low.

- Coase theorem is also called the invariance theorem due to the equivalent outcome of resource allocation under different assignments of private property rights.

- More insightfully, Coase pointed out that the delineation of rights is a prelude to market transactions.

Noble Prize for "Market Failure"

- Market Power
    1. 1982 George J. Stigler "for his seminal studies of industrial structures, functioning of markets and causes and effects of public regulation"
    2. 2014 Jean Tirole for "his analysis of market power and regulation"

- Externalities and Public Goods
    1. 1991 Ronald H. Coase "for his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy"
    2. 2009 Elinor Ostrom "for her analysis of economic governance, especially the commons"

https://www.nobelprize.org/prizes/lists/all-prizes-in-economic-sciences/

Noble Prize for "Market Failure"

- Asymmetric Information
  1. 1996 James A. Mirrlees and William Vickrey "for their fundamental contributions to the economic theory of incentives under asymmetric information"
  2. 2001 George A. Akerlof, A. Michael Spence and Joseph E. Stiglitz "for their analyses of markets with asymmetric information"
  3. 2007 Leonid Hurwicz, Eric S. Maskin and Roger B. Myerson "for having laid the foundations of mechanism design theory"
  4. 2010 Peter A. Diamond, Dale T. Mortensen and Christopher A. Pissarides "for their analysis of markets with search frictions"
  5. 2016 Oliver Hart and Bengt Holmström "for their contributions to contract theory"

https://www.nobelprize.org/prizes/lists/all-prizes-in-economic-sciences/

Government Failures: Examples

Political self interest / lobbying

Policy myopia – search for "quick fixes"
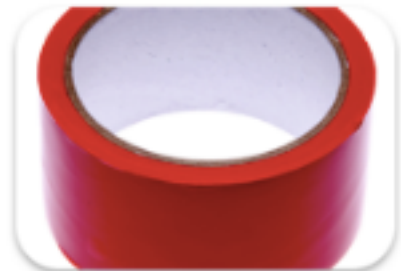
Regulatory Capture

Information failures

Disincentive effects

High Enforcement / Compliance Costs

Conflicting Policy Objectives

Damaging effects of red tape

https://www.tutor2u.net/economics/reference/government-failure

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[2] Pindyck & Rubinfeld, Microeconomics, 9th edition. Pearson.

[3] Krugman & Wells, Economics, 5th edition. Macmillan.

[4] https://en.wikipedia.org/wiki/Efficiency

[5] https://www.econlib.org/library/Enc/Efficiency.html

[6] https://en.wikipedia.org/wiki/Ronald_Coase

[7] http://www.econlib.org/library/Enc/bios/Coase.html

[8] https://www.econlib.org/library/Columns/y2013/SchwartzCoase.html

[9] Monopoly https://www.econlib.org/library/Enc/Monopoly.html

[10] Externality https://www.econlib.org/library/Enc/Externalities.html

[11] Public goods https://www.econlib.org/library/Enc/PublicGoods.html

[12] Tragedy of the Commons https://www.econlib.org/library/Enc/TragedyoftheCommons.html

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Is market failure a sufficient condition for government intervention?

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The Failure of Market Failure. Part I. The Problem of Contract Enforcement

https://www.econlib.org/library/Columns/y2006/Jasayfailure.html

The Failure of Market Failure. Part II. The Public Goods Dilemma

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