
2. 4. Market failures and the rationale for public intervention (Stiglitz ch.4, 7, 8; Gruber ch.5,6,7, Rosen 5,6)

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- ❑ Efficiency rationale for public intervention
 - ❑ Natural monopolies
 - ❑ Public goods
 - ❑ Externalities
 - ❑ Incomplete markets
 - ❑ Information failures

2.4 Market failures: the efficiency rationale for government intervention/1

- According to the first and the second theorems of welfare economics, public intervention may be justified only when there are **market failures**, i.e when markets fail to allocate resources efficiently and to reach a **Pareto efficiency** (first theorem) and/or when there is the need to redistribute resources (**equity reasons**).
- With perfect competition **PMC = SMC** and **PMB=SMB** and at the **equilibrium: SMC=SMB**
- **Market failure** occurs when markets and the price mechanism **fail to allocate scarce resources efficiently** or when the operation of market forces lead to a **net social welfare loss**.

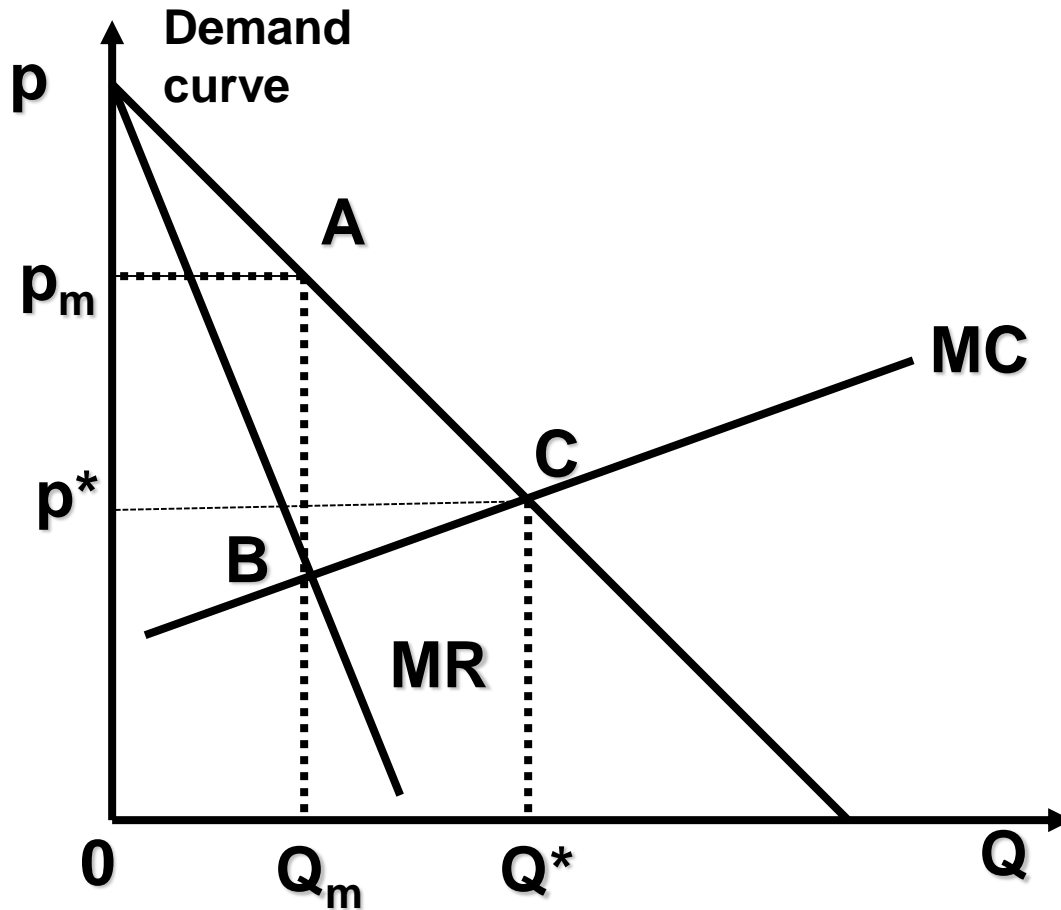
Market failures: the efficiency rationale for government intervention/2

- Economists identify the following **cases of market failure** which may require public intervention to improve efficiency:
 - **Lack of competition:** economic agents affect prices as in monopolies or oligopolies;
 - **Externalities:** consumers and/or producers fail to take into account the effects of their actions on third-parties;
 - **Missing markets and public goods:** some goods or services are not produced by the private market, such as defence, street lighting, and highways.
 - **Lack of complete and perfect information**
 - Even in perfectly competitive markets there may be two further grounds for intervention:
 - Individuals may not be able to make good judgments concerning the goods to consume (**merit goods**)
 - The distribution of income deriving from perfectly competitive markets is socially un-desiderable (**equity considerations**)
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Market failures /1: Lack of competition

- When product **markets are not competitive**, firms control prices and try to maintain their economic rents by keeping prices higher than marginal costs (**$P > MC$**). The result is that output/employment are lower than in perfect competition (**underproduction**).
- Lack of competition may be due to:
 - high economies of scale (**natural monopoly**);
 - restrictive trade practices by large firm(s) (**monopolistic or oligopolistic firms**) which impose barriers to entry;
 - high fixed costs (**non contendible markets**) or
 - **imperfect information** that creates barriers to entry and exit.
- In these cases **competition policies**, such as **antitrust, and regulation**, may be adopted by governments. Examples:
 - The Microsoft court case at the EU level,
 - The EU Bolkestein directive for competition in the service sector.

Imperfect competition/ monopoly



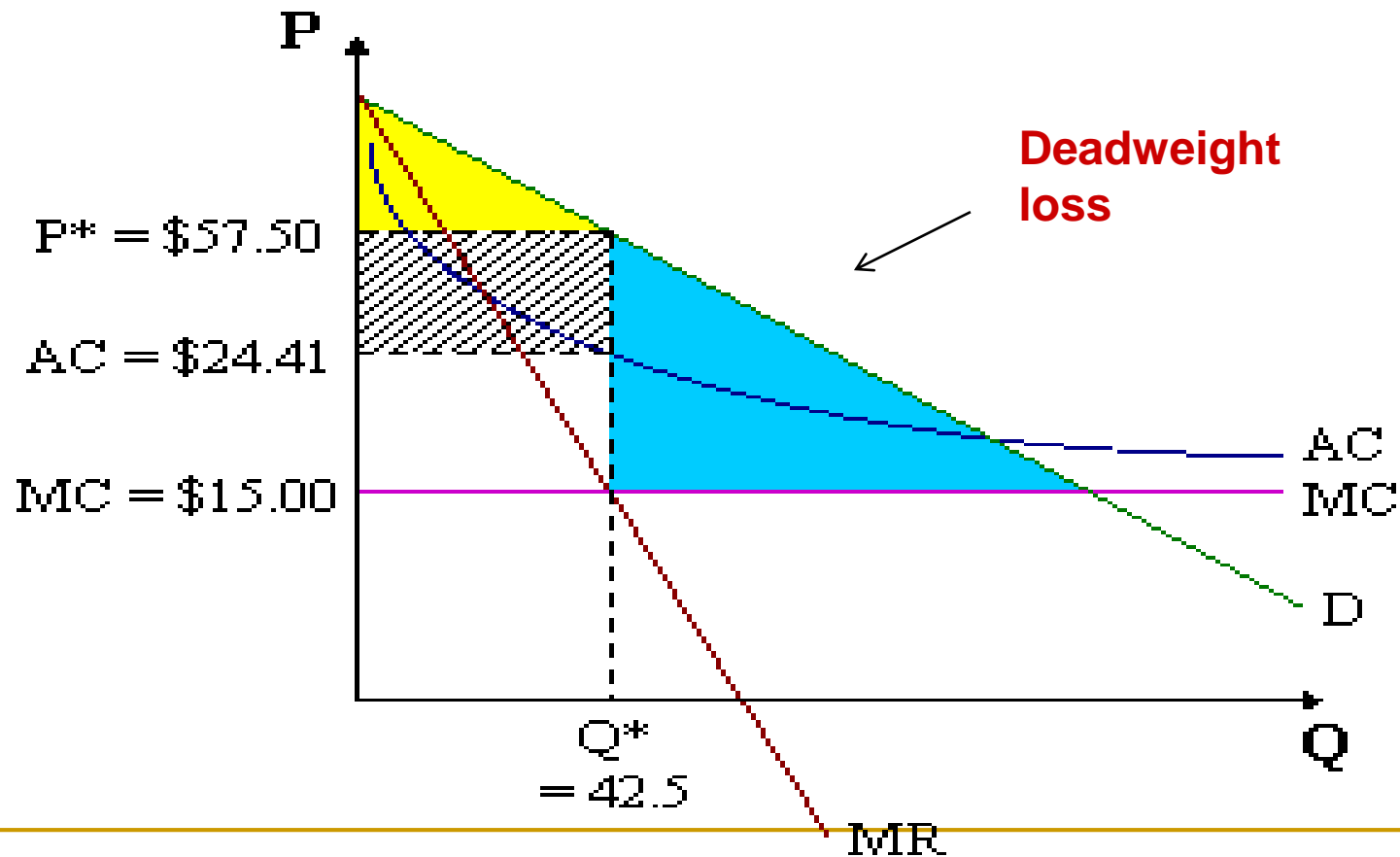
p^* and Q^* represent the competitive equilibrium prices and output ($P^*=MC$);

p_m and Q_m represent the non competitive equilibrium ($MR=MC$).

Lack of competition: Natural monopolies (Stiglitz ch.8.1, Rosen ch.5)

- In some **network industries** (*ex. railways, electricity generation and distribution, water distribution, telecommunication*) there are **high economies of scale** and average production costs fall as production increases, due to the high infrastructural costs associated to the production of the good or service.
 - In these industries, the only **economically feasible (efficient) way to produce goods/services is to have a monopolist**: it is cheaper to have a single firm to produce the entire output rather than several firms producing part of it.
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In natural monopolies MC are always below AC and setting $P=MC$ implies a loss for the firm



Examples of natural monopolies

- An **electric company** is a classic example of a natural monopoly. Once the high fixed costs involved with power generation and power lines is paid, each additional unit of electricity costs very little; the more units sold, the more the fixed costs can be spread, creating a reasonable price for the consumer. Having two electric companies split electricity production, each with their own power source and power lines would lead to a near doubling of price.
 - Another example is **water distribution**, the major production cost is the installation of network of pipes. Once pipes have been installed, the additional costs of supplying water to an extra user are very low, hence it would be inefficient to have two networks of pipes. In this case competition is not feasible. So the market would produce a monopolistic firm, with the inefficiencies associated to it.
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Natural monopolies: possible public interventions

- To reduce monopolistic pricing, the government could intervene:
 - **Granting monopoly rights to a public company** in exchange for a regulation preventing monopolistic pricing (for example setting $P=AC$). Public companies however may be inefficient, due to the absence of competition, and inflate Average costs.
 - **Contracting out the production** to private providers and controlling it, but regulation and controls are costly.
 - **Concentrating government involvement only on the natural monopoly business and encouraging competition where feasible**, for example by separating electricity generation, which may be produced by several producers, from electricity distribution, which is a natural monopoly, as in UK and Italy.
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Public goods (Stiglitz ch.6, Gruber ch.7, Rosen ch. 5)/1

- Some goods or services, such as *clean air, information, street lighting, parks, national defence, justice*, are **pure public goods**, because they are:
 - **non excludable** (it is not possible to exclude someone from their benefits or the costs to do this are prohibitive); **and**
 - **non –rival in consumption** (one individual's consumption does not reduce their availability for others: shared consumption);
 - **non rejectable**, because the costs of producing one unit is equal to the costs of producing more units, a potentially infinite number of users can benefit simultaneously.
- **Impure public goods** are those goods/services that are excludable (without increasing costs too much), but still non rival (ex. highways, education), or vice-versa rival, but non excludable (as parks or streets when congested).

Pure and impure public goods: examples

| | Excludable | Non-excludable |
|--------------------------|---|---|
| Rivalled Consumption | <p>Private Goods For example: food</p>  | <p>Common Goods EX: Open ocean fishing</p>  |
| Non-Rivalled Consumption | <p>Club goods EX: Golf Course, movie theatre</p>  | <p>Public goods EX: National Defense</p>  |

Free riding: Non excludability leads to opportunistic behavior, e.g. free riding: since it is not possible to exclude users who do not pay for it, users are induced to hide their preferences. Free riding is a rationale behaviour when consumers realize that they cannot be excluded from the use of public goods.

What's wrong with Free Riders?



- Free Riders keep firms from making profits.
- If left to the free market, essential services would be under-produced.

To solve the problem, the government can:

- 1. Find new ways to punish free riders.**
- 2. Use tax dollars to provide the service to everyone.**

Example of the free rider problem

- The free rider problem is one of the most important concepts in economics. Some examples, and interesting solutions are the following:
 - **WNYC radio station** has an estimated listening audience of 1 million people, but only 7.5% of their listeners support the station. In the United Kingdom, the BBC charges an annual licensing fee to anyone who owns and operates a TV. In Italy those who own a television set have to pay an annual fee to support public television RAI.
 - A 2000 study of the **file-sharing software Gnutella** showed that 70% of users download files only from others. The file-sharing software Kazaa now assigns users ratings based on their ratio of uploads to downloads and then gives download priority to users according to their ratings.
 - **The City of Cambridge**, in England, tried to provide 350 free green bicycles scattered throughout the city. Users were expected to return each bicycle to one of 15 stands after its use. Within four days, not a single bicycle could be found, most having been likely stolen and repainted.
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Public goods/2

- Since it is not possible to make profits out of public goods, the **market would not provide these goods/services or will provide too little of them.**
- **These goods /services do not necessarily have to be produced by the public sector.** Their production may be contracted out to private providers or non profit organizations.
- If a **pure public good** is to be produced, it is possible to finance it making payment compulsory via **taxation.**
- In the case of **impure public goods** it is possible to introduce **user fees**, to cover at least part of the costs
- In some cases the private sector can provide public goods by charging user fees that are proportional to their valuation of the public good (example Business Improvement Districts in NY)

Problems:

- ❑ **Taxation introduces distortions**
- ❑ **Efficiency and equity problems** in setting **user fees** in the case of impure public goods: if the user fee is set to cover production costs we reach equity (those who benefit pay for it), but reduce efficiency (we may have under-utilization).

Example of private provision of public goods: the Business Improvement Districts in NYC

- It is infeasible to charge pedestrians for using the streets, so municipalities use tax revenues to provide police, sanitation, and public works departments. The public provision of these services does not always work effectively.
 - In New York, the city government spent ten years attempting to clean up Times Square. A group of local businessmen decided to start a Business Improvement District (BID), a legal entity that privately provides local services, and funds these services with fees charged to local businesses.
 - According to New York law if the BID organizers can get over 60% of the local business community to join, then the BID can levy fees on all local businesses.
 - Results:
 - Crime has dropped significantly.
 - The area is cleaner and more attractive.
 - Business and tourism are booming..
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Example of private provision of public goods: charitable givings

- Charitable giving is one form of private provision of public good (important in the US where 2% of GDP given to charities).
 - Charities fund: (1) religious activities, (2) Education, (3) human services, (4) health, (5) arts, (6) various other causes (environment, animals)
 - Encouraged by government: giving can be deducted from income for income tax purposes, charitable organizations are exempted from taxation
 - People give out of (1) warm-glow (name on building), (2) reciprocity (alumni), (3) social pressure (churches), (4) altruism (poverty relief). These effects are not captured in basic economic model
 - Charities have big fund-raising operations to induce people to give based on these psychological effects
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Externalities (Stiglitz ch. 9, Gruber ch.5 and 6, Rosen ch. 6)

- There are **externalities** when the behaviour of some economic agent affects the well being of others and this effect is not compensated, even if there is perfect competition.
 - **Production externalities**: SMC differ from PMC;
 - **Consumer externalities** : SMB differ from PMB
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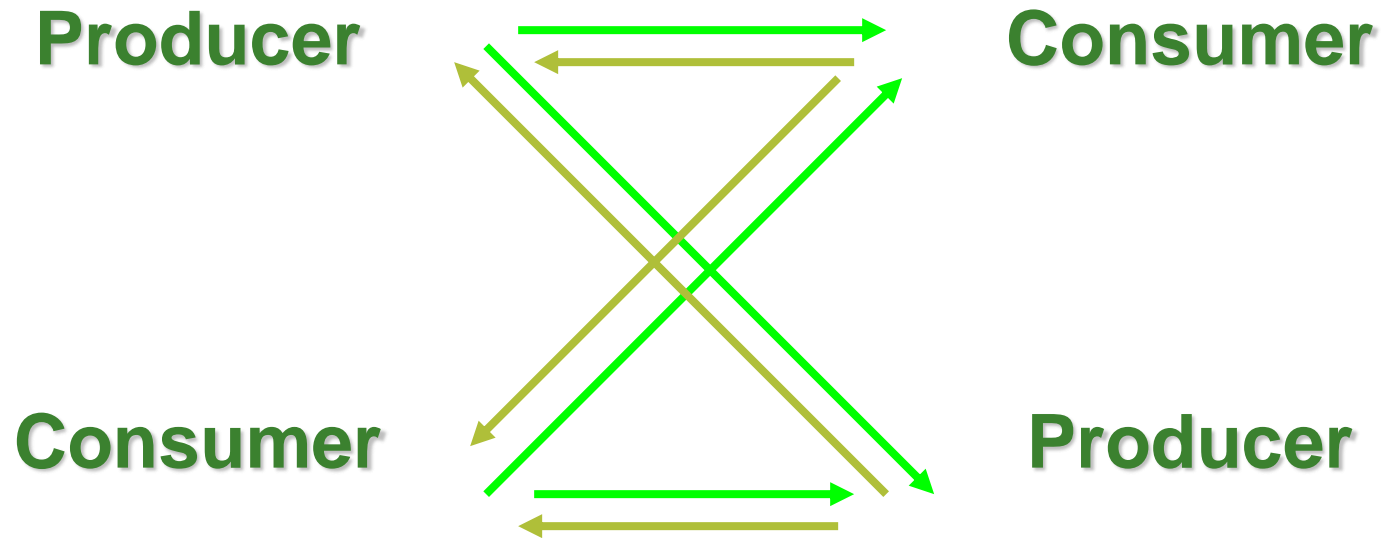
Negative externalities

- **Negative externalities** arise when **social costs are higher than individual costs or social benefits are lower than private (individual) one**, as with *air pollution, smoking, congestion, accidents* costs arising from the private use of roads by vehicles. Individuals and/or firms do not pay for the full consequences of their actions.
 - Since social costs are not passed into higher product prices, prices are too low relative to the marginal (private + social) costs: $P < SMC$.
 - The market equilibrium would entail an **excessive production and/or consumption** of the commodity producing the negative externality (productive and allocative inefficiency).
 - *Note that there is a socially optimum level of a negative externality (such as pollution) in efficiency terms: no pollution means no production!*
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Externalities / 2 Positive externalities

- **Positive externalities:** arise when **social benefits are higher than private ones** (positive consumption externalities) or **social costs are lower than private ones** (positive production externalities), as with *education, investments in R&D, health* etc..
 - The market equilibrium would entail an **under-production or underconsumption** of the commodity, since economic agents are not compensated for improving the well being of others.
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Eight types of externalities



 **Positive externalities**

 **Negative externalities**

Examples of negative and positive externalities

- **Negative externalities:**

- P/C: a firm polluting a residential area
- P/P: a firm polluting a river with fishing activity
- C/P: private road traffic increases transportation times and costs for firms
- C/C : smoking

- **Positive externalities**

- P/P: investments in R&D
 - C/C: nice private gardens
 - C/P: investments in Human Capital
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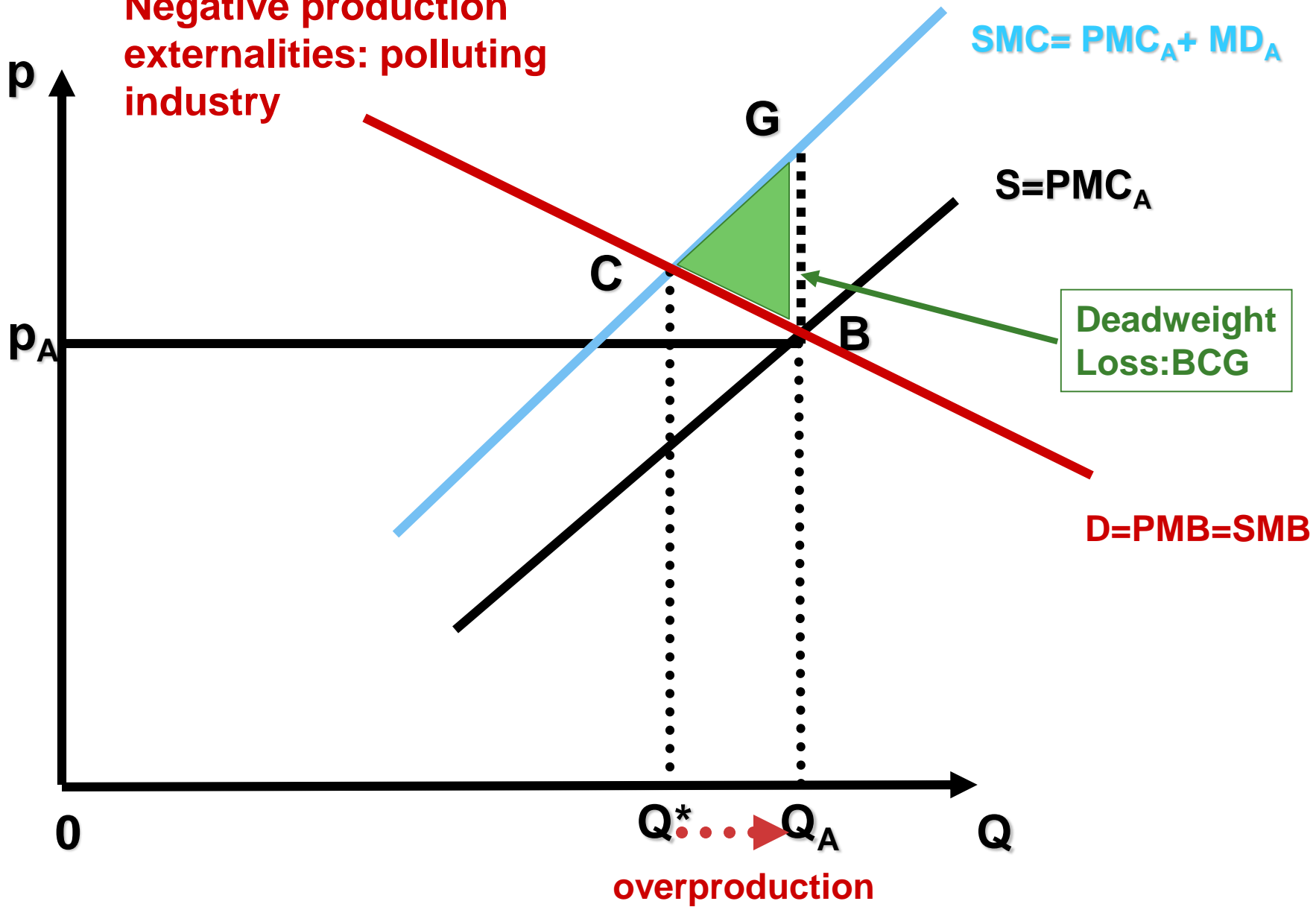
Example: the externality of SUVs

- The consumption of large and heavy cars such as SUVs produces three types of negative externalities:
 - **Environmental Externalities:**
 - The contribution of driving to global warming is directly proportional to the amount of fossil fuel a vehicle requires to travel a mile. SUV drivers use more gas, increasing fossil fuel emissions.
 - **Wear and Tear on Roads:**
 - Each year, in the USA federal, state, and local governments spend \$33.2 billion repairing roadways. Damage to roadways comes from many sources, but a major one is cars, and the damage to the roads is proportional to vehicle weight.
 - **Safety Externalities:**
 - One major appeal of SUVs is that they provide a feeling of security because they are so much larger than other cars on the road. However added insecurity is imposed on other cars on the road.
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Externalities: graphical analysis

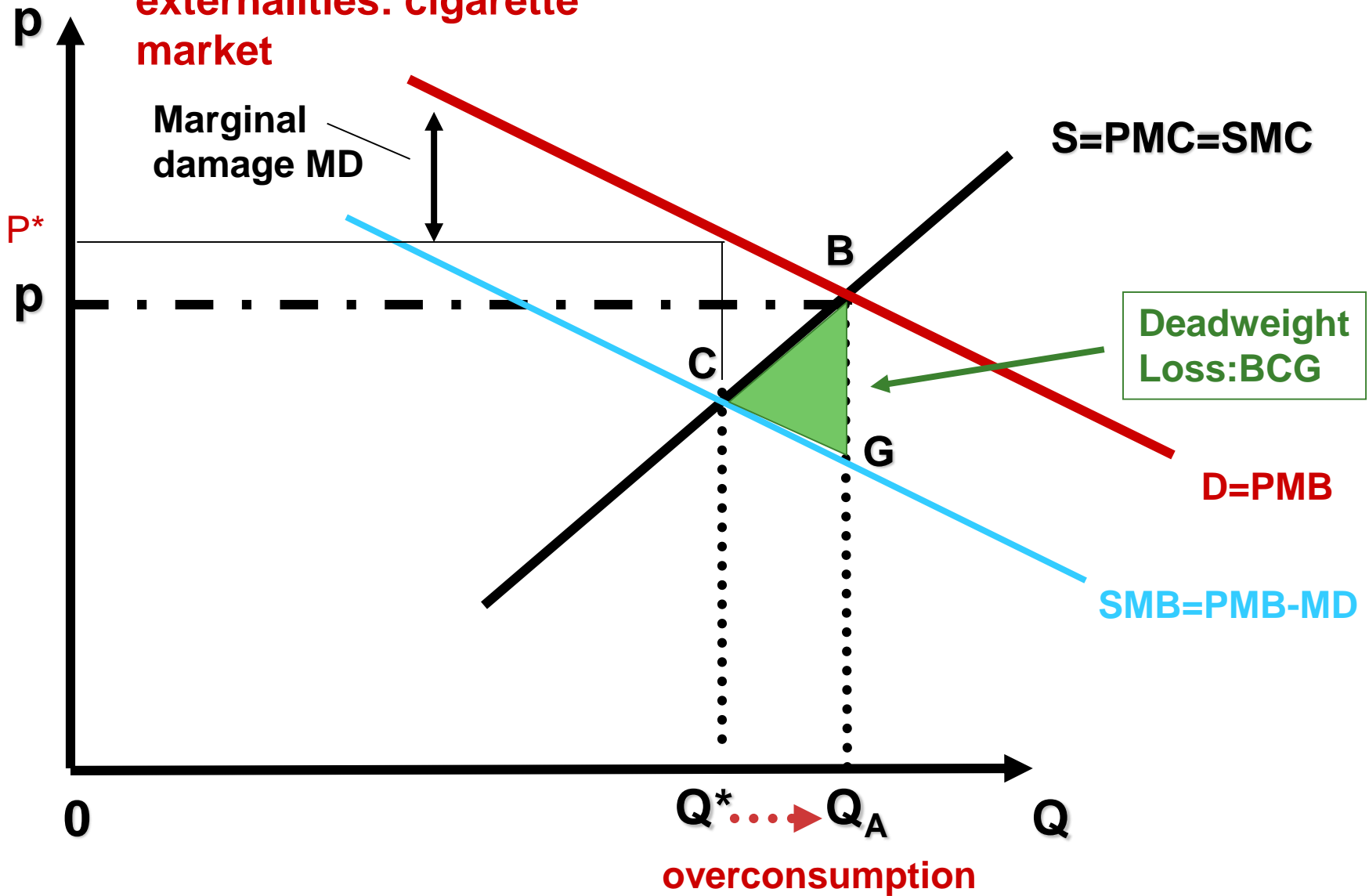
- There are four possibilities:
 - Negative production externality: SMC curve lies above PMC curve
 - Positive production externality: SMC curve lies below PMC curve
 - Negative consumption externality: SMB curve lies below PMB curve
 - Positive consumption externality: SMB curve lies above PMB curve
 - The key is to assess which category a particular example falls into.
 - First, you must assess whether the externality is associated with producing a good or with consuming a good.
 - Then you must assess whether the externality is positive or negative.
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Negative production externalities: polluting industry

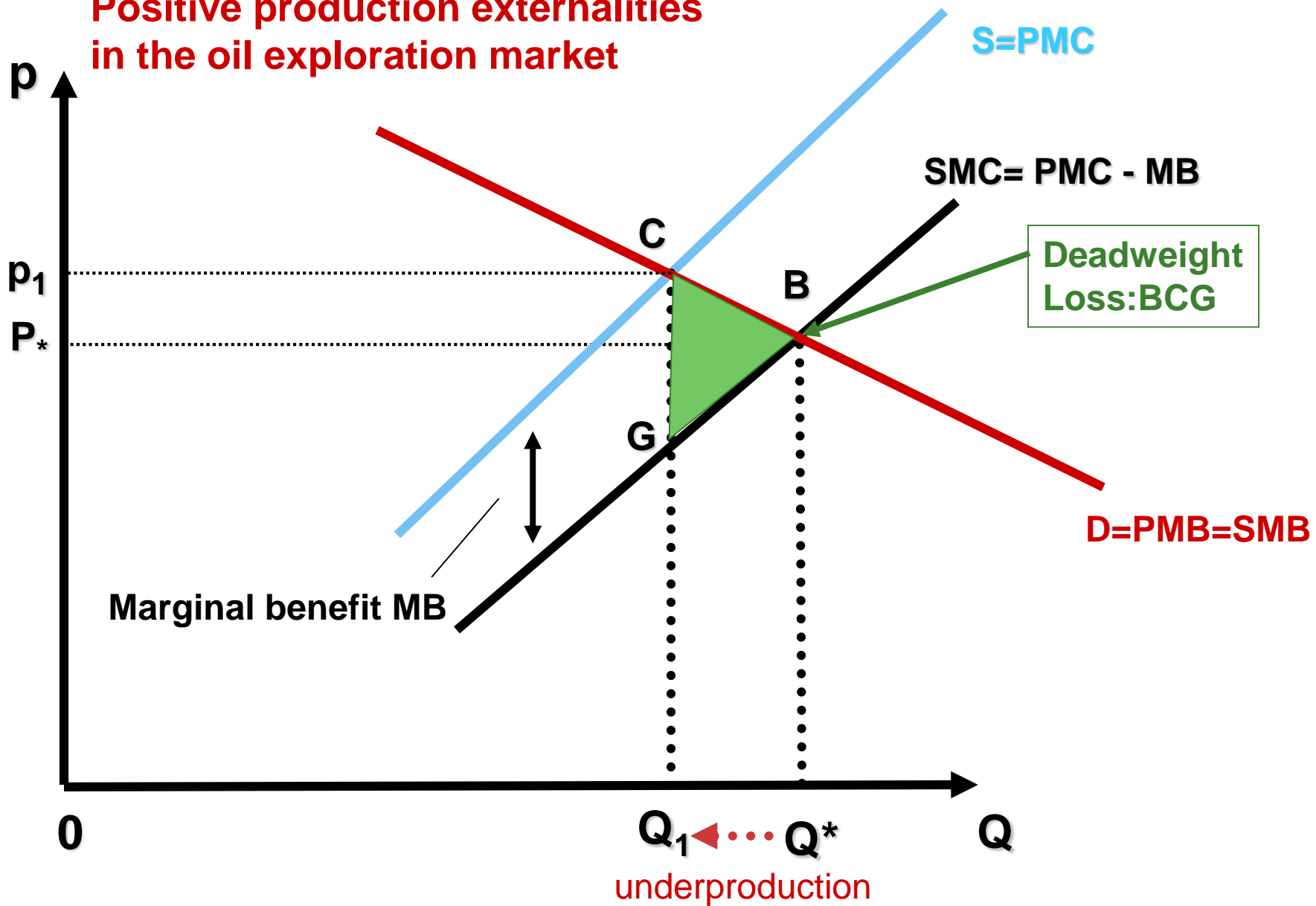


Deadweight Loss: BCG

Negative consumption externalities: cigarette market



Positive production externalities in the oil exploration market



Negative externalities: ways to deal with them

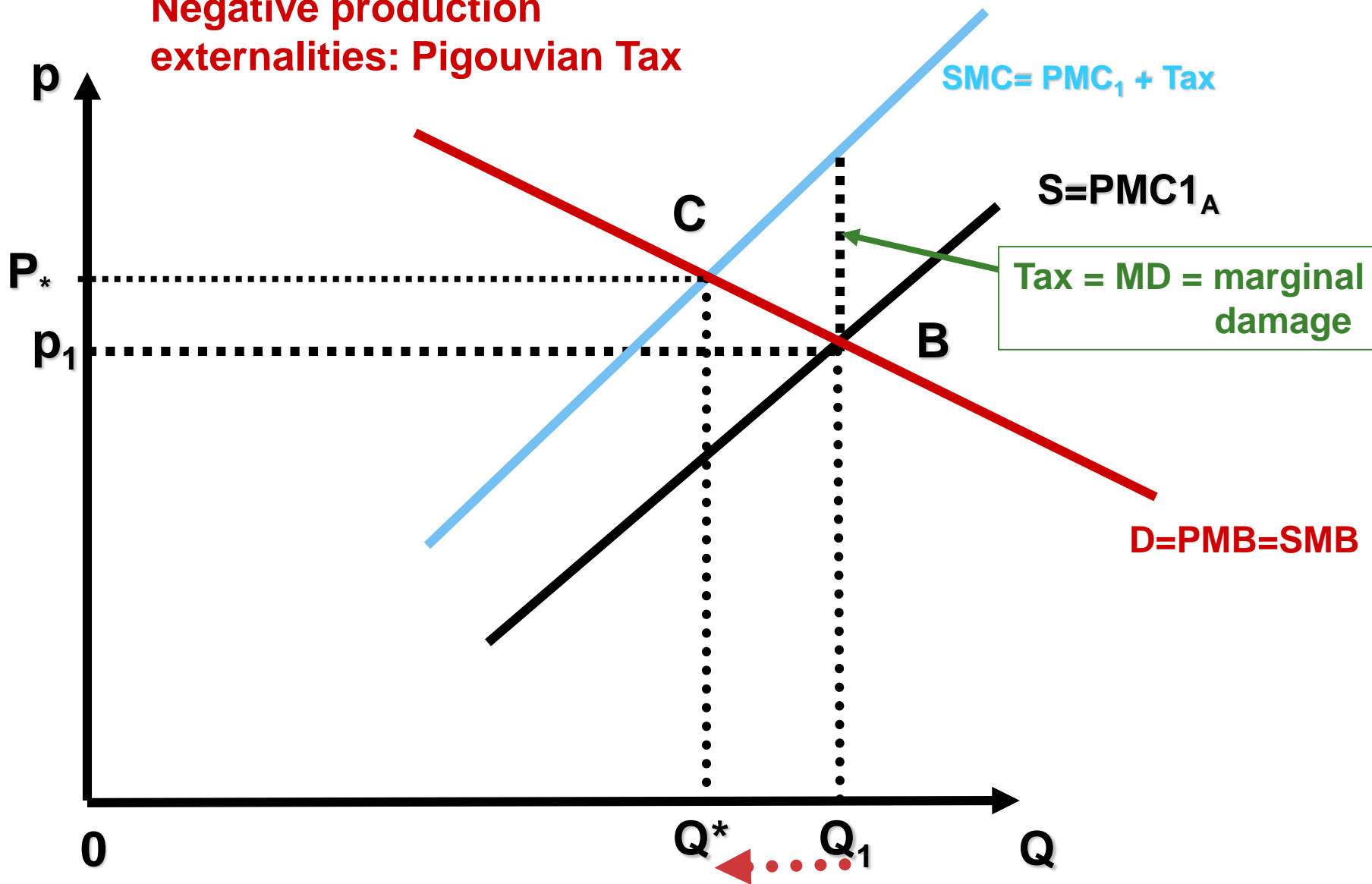
- To deal with these problems need to support the **internalization of the externalities**, through:
 - **Regulation and legal system**, i.e. limiting output (but costly to monitor and enforce): it is a public solution **affecting quantity**. Used when we want to reduce the externality whatever the cost of reduction. } **Public Solution: Quantity**
 - **Introducing abatement subsidies**, ex: subsidizing pollution abatement expenditure with a subsidy equal to the difference between the marginal social benefit of pollution abatement and the firm's marginal private benefit) } **Public Solution: Price**
 - **Taxing** (or imposing fines to) the negative externality (*Pigouvian taxation*) to equalize private and social costs. This is the most appropriate economic solution, since it minimizes the need for gvt intervention and makes the polluter pay for the social costs imposed on others. }
 - **Attribution of property rights** to those involved (*Coase Theorem*), letting the parties involved to make arrangements for the externality to be internalized by compensations agreements } **Private solution: Coase**
 - **Introducing marketable permits**, for example by limiting the amount of pollution each firms can emit and letting firms to trade these pollution permits. Problem: how to define initial permit assignments? }

Negative or positive Externalities-possible solutions: Pigouvian Taxes/subsidies

Pigouvian taxes are corrective taxes levied on polluting firms:

- The tax is designed so as to make the marginal private costs equal to marginal social costs and marginal private benefits equal to marginal social benefits.
 - The pollution tax per unit of production is equal to the marginal cost of pollution
 - Examples of Pigouvian taxes are the Carbon Tax and the Tax Road Pricing
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Negative production externalities: Pigouvian Tax



Negative Externalities - possible solutions: Coase Theorem

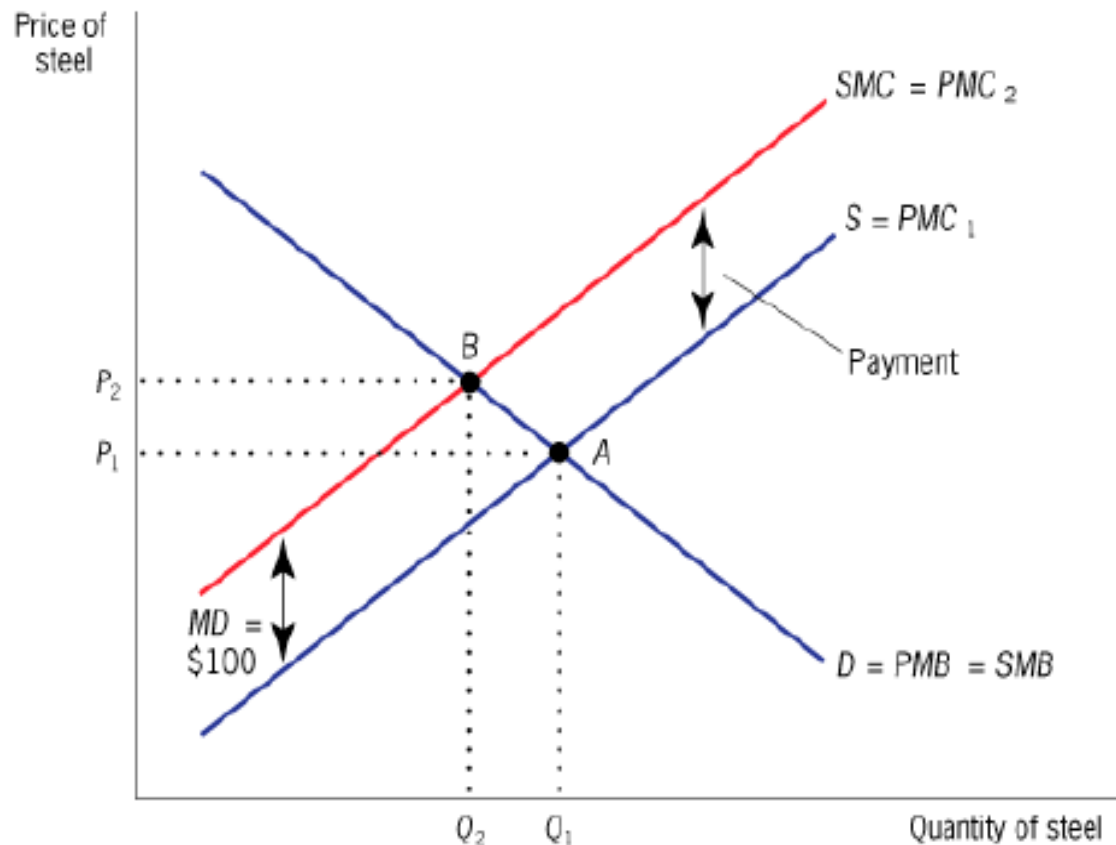
- **When property rights are well defined and bargaining is costless, the negotiations between the party creating the externality and the party affected by it can produce the socially optimal market quantity.**
 - **The efficient solution does not depend on which party is assigned the property right.**
 - The government only establishes property rights, which assign to a particular individual the right to control some assets and to receive fees for the property use.
 - There is incentive for bargaining between the polluter and the other party and to reach an efficient equilibrium on the basis of compensations paid to have the right to pollute or the right to non pollution
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Coase theorem; an example

- A steel firm pollutes a river used by fishermen. If the firm ignores the needs of fishermen produces too much pollution. According to Coase theorem it is possible to reach a solution simply by giving the property rights on the river either to the fishermen or the firm:
 - **The river property rights are given to fishermen:** If river is owned by fishermen then they can charge the firm for polluting the river. They will charge firms the marginal damage (MD) per unit of pollution. Why price pollution at MD? Because this is the equilibrium efficient price in the newly created pollution market.
 - **The river property rights are given to the firm:** If river is owned by the firm then it can charge the fishermen for the increasing costs of polluting less. The firm will also charge individuals the MD per unit of pollution.
 - The final level of pollution will be the same in the two cases !
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Coase solution to negative production externalities

■ FIGURE 5-5



A Coasian Solution to Negative Production Externalities in the Steel Market • If the fishermen charge the steel plant \$100 per unit of steel produced, this increases the plant's private marginal cost curve from PMC_1 to PMC_2 , which coincides with the SMC curve. The quantity produced falls from Q_1 to Q_2 , the socially optimal level of production. The charge internalizes the externality and removes the inefficiency of the negative externality.

Negative Externalities: limits of Coase Theorem/1

- In practice, the Coase theorem is unlikely to solve many of the types of externalities that cause market failures, because it only works only in a limited number of cases, due to the following main problems:
 - The **assignment problem**: In cases where externalities affect many agents (e.g. global warming), assigning property rights is difficult. Coasian solutions are likely to be more effective when the **number of agents involved is small**, e.g. for small, localized externalities rather than for larger, more global externalities involving large number of people and firms.
 - The **holdout problem**: when property rights are shared (as in the case of fishermen in the example) each owner will have power over all the others because joint owners have to all agree to the Coasian solution and risks of **opportunistic behaviour** (free riding) are high. As with the assignment problem, the holdout problem would be amplified with an externality involving many parties
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Negative Externalities: limits of Coase Theorem/2

- **The Free Rider Problem:** When an investment has an individual cost but a common benefit, individuals will underinvest (example: a single country is better off walking out of the Kyoto protocol for carbon emission controls)
- **Transaction Costs and Negotiating Problems:** The Coasian approach ignores that it is hard to negotiate when there are large numbers of individuals on one or both sides of the negotiation. This problem is amplified for an externality such as global warming, where the potentially divergent interests of billions of parties on one side must be somehow aggregated for a negotiation.
- **Redistributive problems** implicit in the allocation of property rights are not considered. The determination of who compensate whom (the polluter compensates society for polluting, or vice versa society compensates the polluter for not polluting) makes a great difference to the distributive implications of the externality.

Positive externalities: ways to deal with them

- Two options for gvt intervention when there are positive externalities and under-production:
 - **Compulsion:** for example in the case of compulsory education (problem: how much education should be compulsory?)
 - **Subsidies:** subsidies reduce the price paid by consumers and may increase demand up to the socially optimal level (ex. School vouchers). However it is difficult to design appropriate subsidies or taxes: need to compare the costs of public intervention with the benefit deriving from improving allocative efficiency
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Merit goods (a form of externality)

- Pareto Efficiency assumes that individuals are the best judges of their own welfare, however **individuals may undervalue the personal benefits** derived from some commodities or services (i.e. they may attribute insufficient merit to the commodity, for example they may make insufficient provisions for old age or illness), and this would produce allocative inefficiency.
 - The government may oblige or encourage individuals to consume these goods/services for their well being using:
 - **Compulsion** (like: obligation to adopt safety measures, compulsory pensions savings, compulsory education)
 - **Improving information** (ex: information on health risks)
 - **Subsidies** to reduce the price paid by consumers (as in the case of tax relief on the purchase of private health insurance and private pensions).
 - **Taxes** to increase the price of goods producing negative externalities (ex. cigarettes or junk food or SUVs).
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Incomplete or complementary markets

- **Incomplete markets** arise when some goods/services are not provided by the market (missing markets). For example insurance and capital markets are incomplete because they do not provide insurance for many important risks (such as poverty, unemployment, etc.).
 - Possible reasons: *high transactions costs; asymmetries of information and enforcement costs* which produce **adverse selection and moral hazard problems**.
 - **Complementary markets** are those services/ products which require large scale coordination to be profitable and prices do not function as coordination devices (as in the case of urban renewal programmes), in these case the government may assume the coordination function.
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Information failures

- Often information is not complete and the buyer may not have the same information as the seller or vice versa (asymmetric information). Information is sometime a public good, so that the market does not provide it. **Adverse selection and moral hazard** may occur in these cases.
 - **Examples:** Unemployed workers may not know where available jobs are and employers do not know the skills of workers; sellers of insurance do not know relevant information on the insurance buyers.
 - The government should intervene to support the diffusion of information and to reduce information asymmetries among buyers and sellers, by appropriate regulation. However risk of excessive regulation, which reduces competition.
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Adverse selection and the insurance markets

- There is **adverse selection** when one of the party does not know some characteristics of the other party which are relevant for the contract to be stipulated.
 - ***Insurance markets*** are examples of these problems: lenders do not know the riskiness of borrowers and set interest rates in order to cover for such risks.
 - **If the interests rates are too high only high risk borrowers, who are more likely not to repay the loan, will be willing to accept the loan, while low risk borrowers will not be willing to pay high interest rates**
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An example of Adverse selection: Insurance against health risk

- Some individuals present low health risks, others present high risks.
- *With complete information*, the premium to be applied should be of 1000 euro for the low risk individuals and 2000 euro for the high risk ones
- **But the insurer does not know who is low risk and who is high risk before stipulating the insurance contract.** He only knows that the low risk individuals are about 20% of the population. He thus adopts the following criteria to set the price at which to provide insurance:
$$P = 0,20 \times 1000 \text{ euro} + 0,80 \times 2000 \text{ euro} = 1800 \text{ euro}$$
- **However at this price, only the high risk individuals will be willing to buy the insurance.** There is an adverse selection and no insurer will be willing to sell insurance services.
- To solve the problem the government:
 - May **directly provide some types of insurances** (usually those deriving from high social risks, such as unemployment, invalidity, health, old age risks)
 - May **introduce regulatory measures to support the private provision of insurance**

Moral hazard

- **The insurer is not able to control the actions that** For example in the insurance market, the insurer cannot control the insured behaviour.
 - **Example: insurance against theft.**
 - Some insured individuals may not pay attention to theft risks. With perfect information on the insured behaviour, the insurer may set the premium according to the degree of attention against theft of the insured
 - If the insurer cannot observe the insured degree of attention and/or the costs of observation (**transaction costs**) are high, insured individuals may reduce their attention and the probability of theft increases (endogeneity). The risks for the insurer are too high and the market will not offer such insurance.
 - Possible solutions are again **public intervention**:
 - **Directly providing some types of insurances** (usually those deriving from high social risks, such as unemployment, invalidity, health, old age risks)
 - introducing **regulatory measures /subsidies** to support the private provision of insurance
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Summing up/1 A taxonomy of market failures

| type of commodity | pure public good | Mixed goods with externalities | Merit goods | Pure private goods |
|---|-------------------------|--|--|---------------------------|
| Who benefits' | All in society | Consumers and society | Consumers and society | Individual consumers |
| Exclusion of non payers | impossible | Difficult or impossible | feasible | feasible |
| Feasibility of pricing | Not feasible | feasible | feasible | feasible |
| Consumer choice | none | some | full | full |
| Impact of use on supply | none | reduces supply | reduces supply | Reduces supply |
| Who pays | Taxpayer only | Consumer pay price adjusted by tax/subsidy | Consumer pay price subsidies by taxpayer | Consumers pay full costs |
| Relation bw payment and use | none | close | close | full |
| Who decides what and how to produce? | Government only | Modified market | Modified market | Market only |

Summing up/2

- We have seen that **market failures** may ask for government intervention for efficiency reasons
 - Regulation, direct public provision of goods and services, taxes and subsidies may be used to correct for market failures.
 - The government may intervene also for **equity reasons**, to redistribute resources (we have seen that PE may be reached at different levels of initial income distribution).
 - The problem is that **government intervention may introduce distortions**, either directly or through *taxation which affects market behaviour*. Lump sum transfers/taxes (as required by the 2° theorem) are difficult to implement, due to the lack of information.
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