Market Failure

Causes of Market Failure

Market Failure arises when a free market fails to allocate resources efficiently.

1) **Imperfect Competition** (Monopoly, Oligopoly, etc.)
   >>> underallocation of resources
2) **Externalities**
   >>> underallocation or overallocation of resources
3) **Public Goods** (Free-Rider Problem)
   >>> underallocation of resources
4) **Asymmetric Information**
   1) Adverse Selection (hidden information)
   2) Moral Hazard (hidden action)

   >>> underallocation of resources

Externalities

Externality is the "effect" imposed on a third party, as a result of an action by any decision maker.

The effect can be **negative (cost) or positive (benefit)**.

The action of an agent can be **production or consumption**.

Externality is one cause of market failure.

In a free market, people pursuing self-interest tend to ignore these external effects on others, resulting in welfare loss.

Externalities

Examples

1) **Negative Consumption Externality**
Consumption of cigarettes harms nearby people.

2) **Positive Consumption Externality**
Consumption of vaccine helps prevent contagious diseases.

3) **Negative Production Externality**
Production of some goods creates pollution.

4) **Positive Production Externality**
Bees from beekeeping help pollinate surrounding trees.

Key Terms (Production Side)

Marginal Private Cost (MPC) is the MC of private producers. Hence, MPC can be considered as the supply curve in a competitive market.

Marginal External Cost (MEC) is the MC on the third party.

Marginal Social Cost (MSC) is the MC of the society (private producers + the third party).

Thus, **MSC = MPC + MEC**.

Without production externality, MSC = MPC = S.

Key Terms (Consumption Side)

Marginal Private Benefit (MPB) is the MB of private consumers. Hence, MPB can be considered as the demand curve in a competitive market.

Marginal External Benefit (MEB) is the MB on the third party.

Marginal Social Benefit (MSB) is the MB of the society (private consumers + the third party).

Thus, **MSB = MPB + MEB**.

Without consumption externality, MSB = MPB = D.

Private Optimum vs Social Optimum

In a free market, private buyers and sellers trade at the point where **MPB = MPC or D = S**.

At this point, private welfare is maximized, so it is called **the private optimum** where the free market will operate.

However, private parties often fail to take into account for effects on third parties (MEC or MEB).

Private Optimum vs Social Optimum

In the society's POV, buyers and sellers SHOULD trade at the point where **MSB = MSC**.

At this point, social welfare is maximized, so it is called **the social optimum** where the market should operate.

At MSC = MSB, we have **social efficiency**. This is the optimal allocation of resources in society (private parties + third parties), taking into account all external costs and benefits.

Externalities and Market Failure

The presence of externalities implies that the "private optimum" may not be the same as the "social optimum".

Private parties pursuing their self-interest will opt for the private optimum, but this will lead to welfare loss for society.

At Private Optimum where MSB > MSC,
there is underallocation of resources.

At Private Optimum where MSB < MSC,
there is overallocation of resources.

Negative Production Externalities

Consider the case of firms polluting the environment

Given NO "consumption" externality, we have **D = MPB = MSB**.

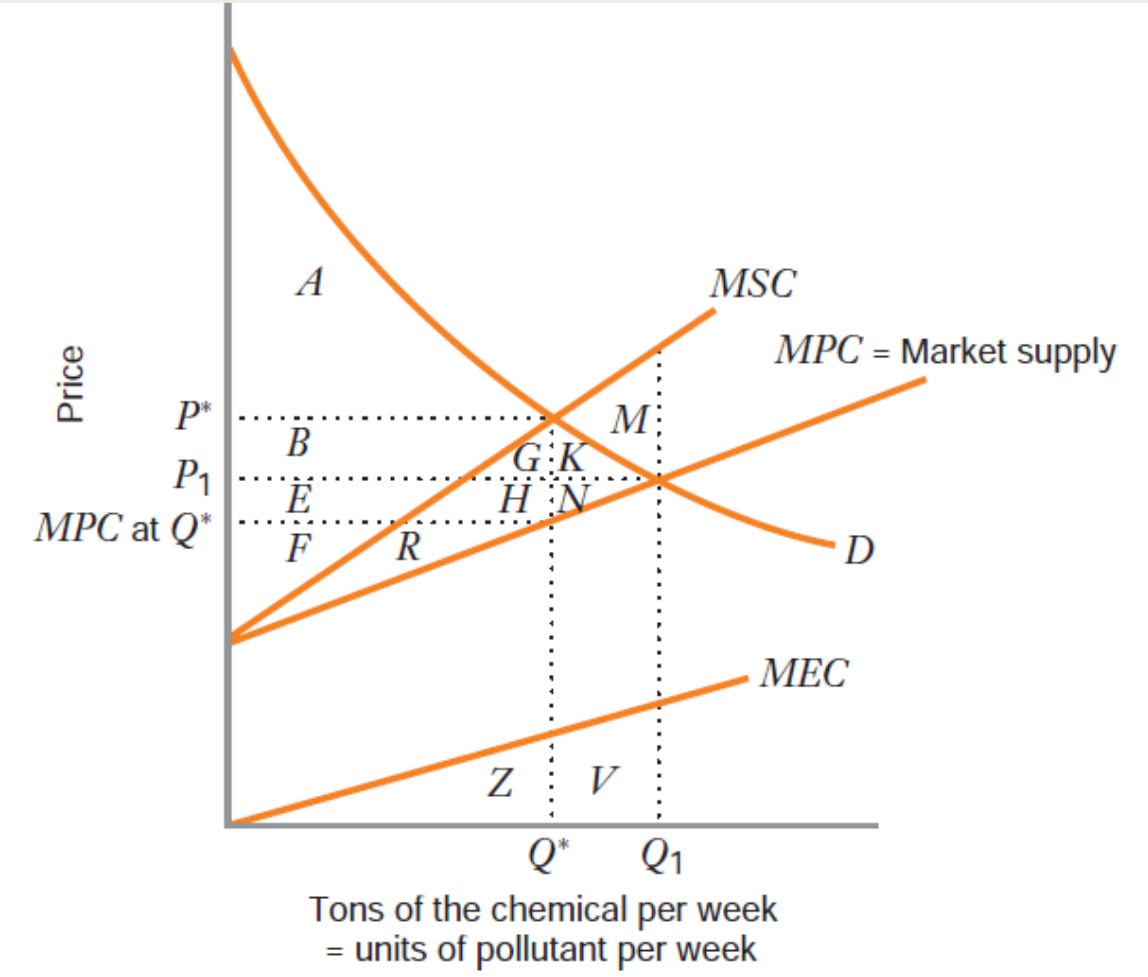
Because of the pollution, there is now cost to the third party.

MEC > 0, and thus we have **MSC > MPC = S**.

MSC lies above MPC.

We assume that MEC is increasing, i.e. the more the firms produce, the higher the MC is on the third party.

Negative Production Externalities



Negative Production Externalities

	Equilibrium (price = P_1)	Social Optimum (price = P^*)	Difference between Social Optimum and Equilibrium
Consumer surplus	$A + B + G + K$	A	$-B - G - K$
Private producer surplus	$E + F + R + H + N$	$B + E + F + R + H + G$	$B + G - N$
−Cost of externality	$-R - H - N - G - K - M$	$-R - H - G$	$M + N + K$ (external cost savings)
Net social benefits (consumer surplus + private producer surplus − cost of externality)	$A + B + E + F - M$	$A + B + E + F$	M (increase in net benefits at social optimum)
Deadweight loss	M	Zero	M

Negative Production Externalities

<u>Consider the case of firms polluting the environment</u>

MPC = S intersects D = MPB = MSB at Q_1.
This is the free market quantity.

MSC intersects D = MPB = MSB at Q*.
This is the socially optimal quantity.

Since Q_1 > Q*. This shows "**<u>overproduction</u>**" of the good.
At Q_1, MSB < MSC, thus the social welfare is not maximized.

That is, most polluters is now producing too much. To increase social welfare, the government should intervene this free market to lower production of the good.

Exercise

LEARNING-BY-DOING EXERCISE 17.1

The Efficient Amount of Pollution

Problem Evaluate the following argument: "Since pollution is a negative externality, it would be socially optimal to declare illegal the use of any production process that creates pollution."

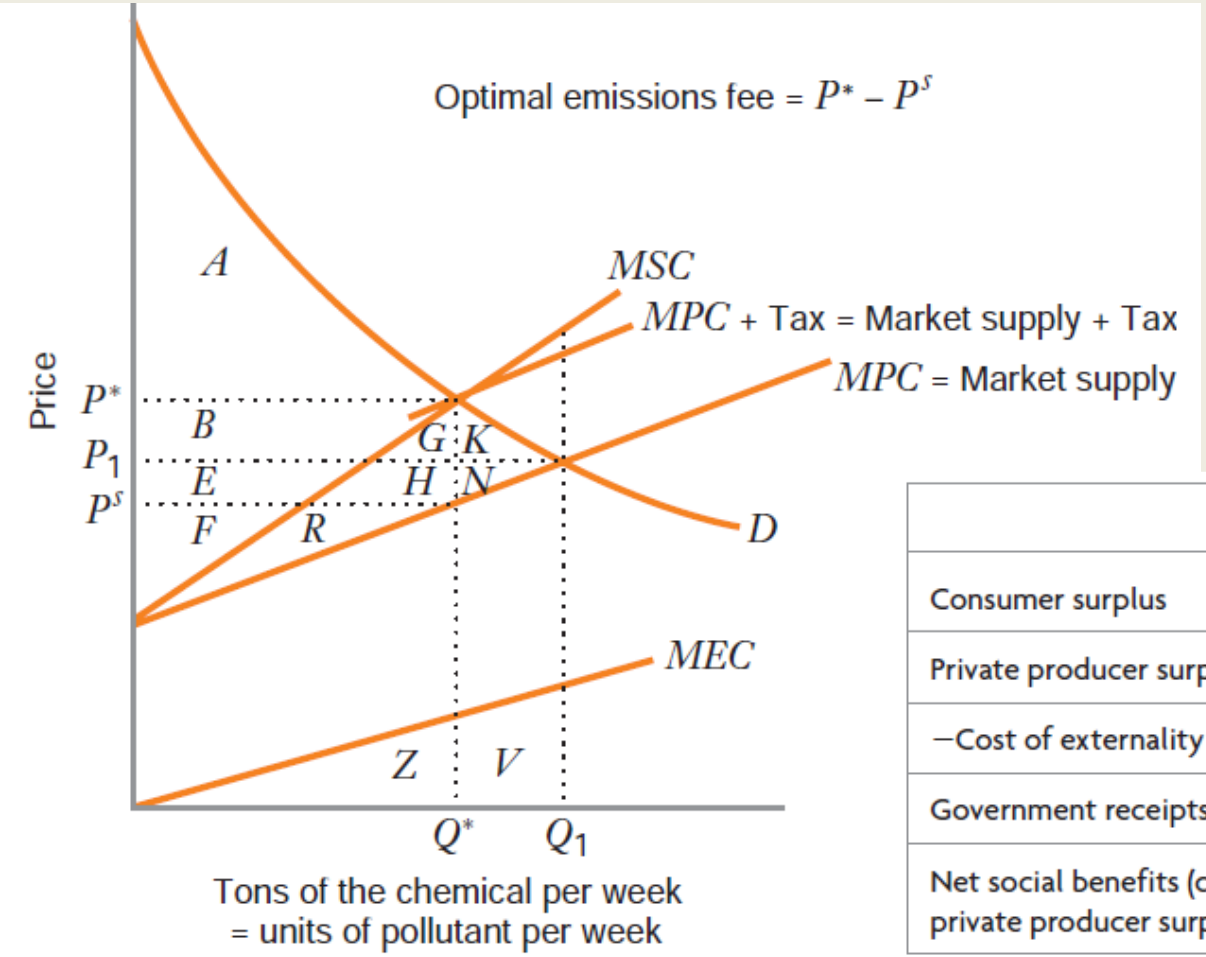
Solutions to Pollution

To correct externalities, the government should intervene the free market. Solutions to pollution include:

1) **Emissions Standards**
   An official limit on the amount of pollution emission
2) **Emissions Fees**
   A tax on pollution released into the environment
3) **Emissions Permits** (also called "Cap and Trade")
   The government sets a fixed number of permits to emit pollution. Polluting firms can sell and buy these permits.

A **Pigovian tax** (also spelled **Pigouvian tax**) is a **tax** on any market activity that generates negative externalities.

Emission Fees / Pigouvian Tax



	Equilibrium (with tax)
Consumer surplus	A
Private producer surplus	$F + R$
−Cost of externality	$-R - H - G$
Government receipts from emissions tax	$B + G + E + H$
Net social benefits (consumer surplus + private producer surplus − cost of externality)	$A + B + E + F$

Emission Fees / Pigouvian Tax

Tax on firms means they face higher cost of production.

This will shift the supply curve or MPC to the left.

The optimal tax/fee will make supply curve or MPC intersect demand curve at Q* (where MSC = MSB = D).

To find the optimal tax, TAX = MEC(Q*).

At Q*, the market now becomes socially efficient.

Positive Consumption Externalities

Consider the case of consumers using vaccine

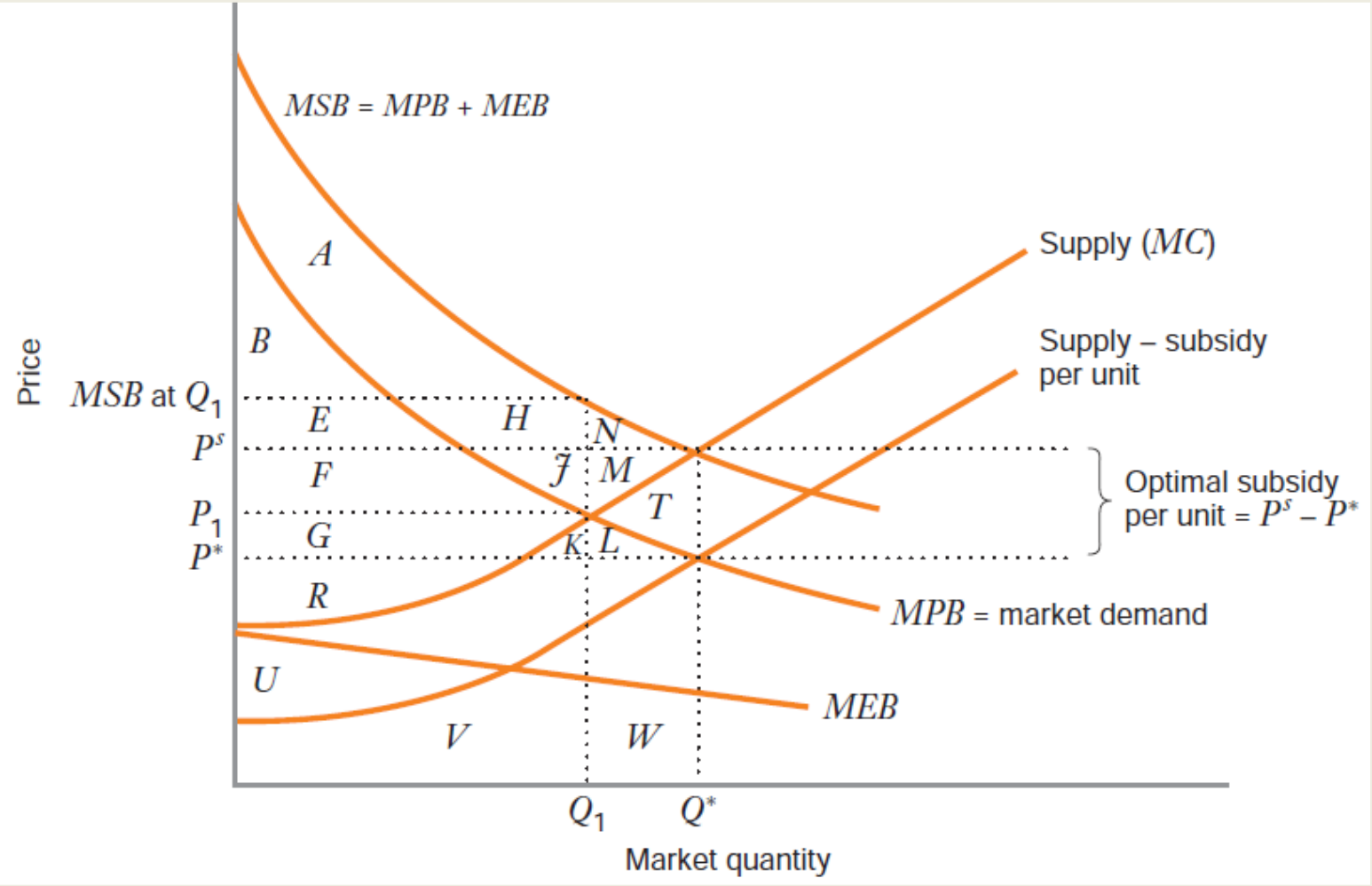
Given NO "production" externality, we have **S = MPC = MSC**.

Because of the vaccine, there is now benefit to the third party.

MEB > 0, and thus we have **MSB > MPB = D**.

MSB lies above MPB.

Positive Consumption Externalities



Positive Consumption Externalities

	Equilibrium (no subsidy)	Social Optimum (equilibrium with subsidy)	Difference in Benefits between Social Optimum and Equilibrium with No Subsidy
Private consumer surplus	$B + E + F$	$B + E + F + G + K + L$	$G + K + L$
Producer surplus	$G + R$	$F + G + R + J + M$	$F + J + M$
Benefit from externality	$A + H + J$	$A + H + J + M + N + T$	$M + N + T$
−Government cost from subsidy	zero	$-F - G - J - K - L - M - T$	$-F - G - J - K - L - M - T$
Net social benefits (private consumer surplus + producer surplus + benefit from externality − government cost)	$A + B + E + F + G + H + J + R$	$A + B + E + F + G + H + J + M + N + R$	$M + N$

Positive Consumption Externalities

Consider the case of consumers using vaccine

MPB = D intersects S = MPC = MSC at Q_1.
This is the market quantity.

MSB intersects S = MPC = MSC at Q*.
This is the socially optimal quantity.

Since $Q_1 < Q^*$. This shows "**underconsumption**" of the good.
At Q_1, MSB > MSC, thus the social welfare is not maximized.

That is, people are consuming too little. To increase social welfare, the government can subsidize vaccine production.

Subsidy

Subsidy on firms means they face lower cost of production.

This will shift the supply curve or MPC to the right.

The optimal subsidy will make supply curve or MPC intersect demand curve at Q* (where MSB = MSC = S).

To find the optimal subsidy, SUBSIDY = MEB(Q*).

At Q*, the market now becomes socially efficient.

Public Good

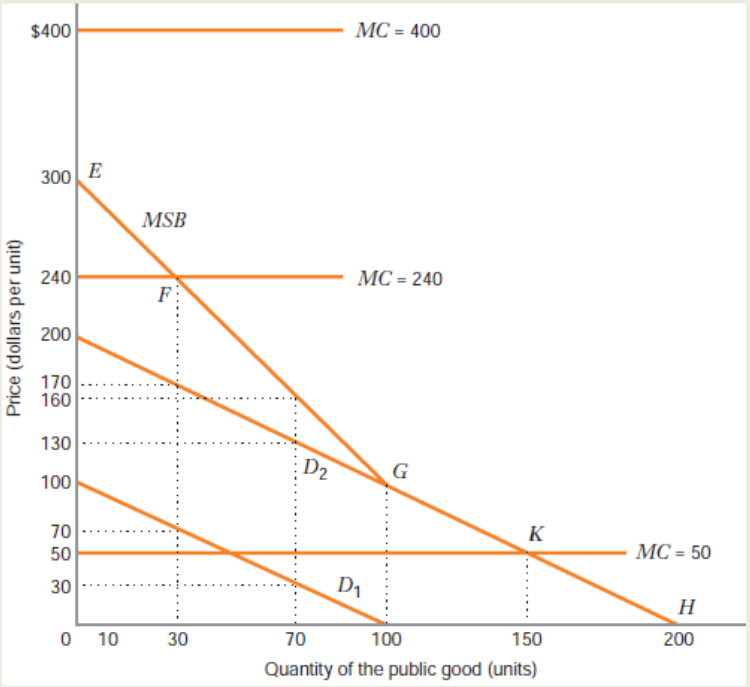
A public good is a good that is non-rivalrous and non-excludable.

Non-rivalrous means that consumption of a good by one person does not reduce the quantity that can be consumed by others.

Non-excludable means that one person cannot exclude others from consuming the good.

Examples of public goods include street lighting, knowledge, national defense, etc.

Public Good



Due to non-rivalry and non-excludability, the MSB will be the "VERTICAL" sum of all individual demands or MPB.

For example, at Q = 30,
Mr. 1 values the good at MPB = 70, and
Mr. 2 values the good at MPB = 170.
Thus, at Q = 30, MSB = 240.

Efficient Provision of Public Good

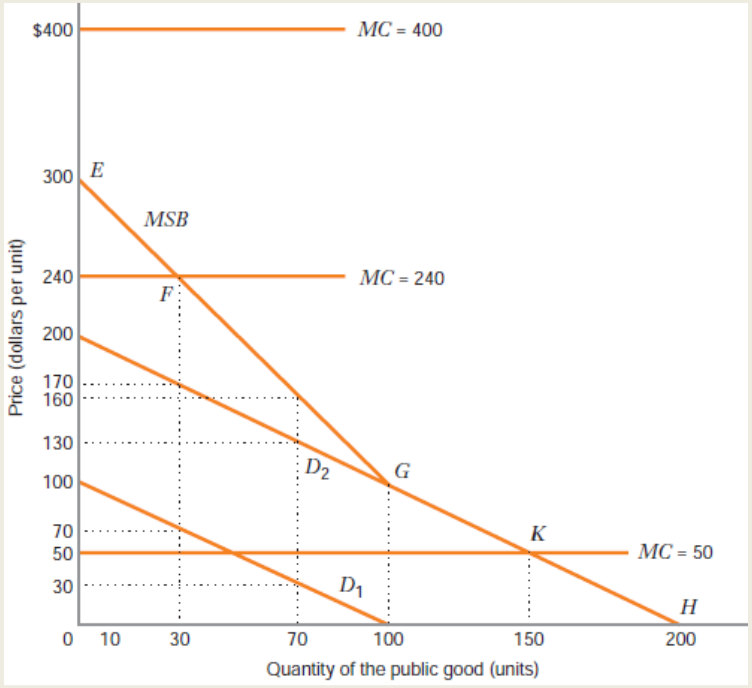
Public Goods cause market failure as they are often underprovided (MSB < MC) in a free market because of…

Free-Rider Problem: no one wants to pay for the provision of public goods because he/she expects others to pay.

Self-Interest Behavior: people consume public goods at the point that maximizes private welfare (MPB=MC), without accounting for the benefits that others can also receive.

Public Goods should be provided at the point where MSB = MC. Usually, this requires government intervention.

Efficient Provision of Public Good



The MC (= MSC = MPC = S) of a public good is constant because it is the opportunity cost of using resources to produce the good instead of other goods.

If MC = 50, Qopt = 150.
Mr. 2 may buy all of them (Qmkt = 150), and Mr. 1 can also benefit from them.

If MC = 240, Qopt = 30. But Qmkt = 0 because MPB < MC.
However MSB > MC, so there is welfare loss.
If MC = 400, Qopt = 0. In this case, the public good is too costly.

Efficient Provision of a Public Good

LEARNING-BY-DOING EXERCISE 17.4

Optimal Provision of a Public Good

In Figure 17.7, demand curve D_1 is $P_1 = 100 - Q$, and demand curve D_2 is $P_2 = 200 - Q$. (We have written these in *inverse* form, with price on the left and quantity on the right, for reasons explained below.)

Problem

(a) Suppose the marginal cost of the public good is \$240. Determine the efficient level of production of the public good algebraically.

(b) Suppose the marginal cost of the public good is \$50. Determine the efficient level of production of the public good both graphically and algebraically.

(c) Suppose the marginal cost of the public good is \$400. Determine the efficient level of production of the public good both graphically and algebraically.

Hint:

1) MSB = $P_1 + P_2$
2) MSB = MC

Answer:

a) Q* = 30
b) Q* = 150
c) Q* = 0

Asymmetric Information

Asymmetric Information arises when one party in a transaction has more information than the other party.

1) **Adverse Selection** (hidden information / before contract): One party with better information may selectively participate in trades that benefit them the most, at the expense of the other party.
2) **Moral Hazard** (hidden action / after contract): One party with better information may not enter a contract in good faith, knowing that it does not bear the full risk, at the expense of the other party.

Asymmetric Information

Examples: Covid-19 Insurance

Adverse Selection (hidden information, before contract)

High-risk people will want to buy Covid-19 insurances. Knowing this, insurance sellers may charge higher prices. As a result, low-risk people may not buy the expensive insurances.

Moral Hazard (hidden action, after contract)

After buying insurances, high-risk people now expose themselves to even more risk, knowing that they get paid if they are infected. This can cause the insurance sellers to raise prices even more or become bankrupt.

Asymmetric Information

Solutions

- Requirement to disclose information
- Insurance deductibles
- Screening
- Signaling
- Incentive-compatible contract