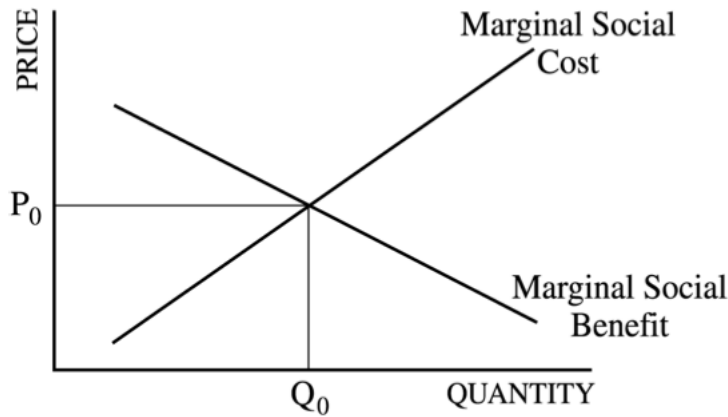


- 1 [FRQ] The graph below shows the price ( $P_0$ ) and quantity ( $Q_0$ ) at which there is an efficient allocation of resources.

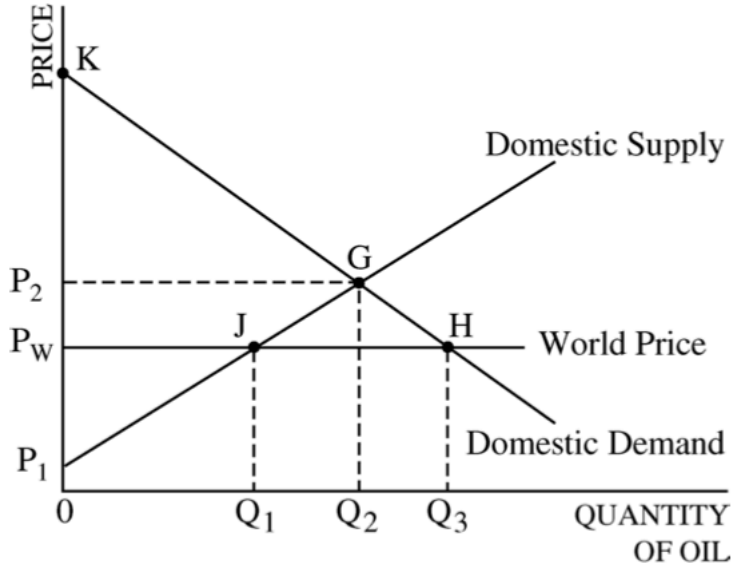


However, in some cases

**the market fails to allocate resources efficiently.**

- A Assume the chemical industry is polluting the air.
- Using marginal benefit and marginal cost analysis, explain how the chemical industry is misallocating resources.
  - Identify one policy or action the government could take to correct this market failure.
- B Assume it is difficult to exclude nonpayers from enjoying the benefits of national defense.
- Using marginal benefit and marginal cost analysis, explain how the private market will fail to produce the efficient level of national defense.
  - Identify one policy or action the government could take to correct this market failure.

2 [FRQ] The graph below shows the demand for oil by United States residents, the supply of oil by United States producers, and the world price of oil. Use the labeling of the graph to answer the following questions.



- A Identify the following before international trade occurs.
- i Price of oil in the United States market
  - ii Quantity of oil produced in the United States
- B Now assume that the United States begins to import oil at the world market price of  $P_w$ . Identify the quantity imported by the United States.
- C Identify the consumer surplus in the United States market for each of the following cases.
- i Before international trade
  - ii After international trade
- D Identify the producer surplus in the United States market for each of the following cases.
- i Before international trade
  - ii After international trade
- E Identify the net gain in total surplus from trade.

# #1

## Correct Answer:

**Part a:** Within the chemical industry (or market) at the unregulated level of output the marginal social cost of production exceeds the marginal social benefit. In other words, with this negative externality, there is an over allocation of resources to the chemical industry; the level of output is greater than the efficient level. The government should introduce a per unit tax on output, raising the marginal private cost of production and reducing output. Alternatively, the government could introduce some measure to reduce directly the level of output.

**Part b:** National defense is a public good. Individuals have an incentive to withhold their true demand or willingness to pay for the good, i.e., the free-rider problem. Thus, at the level of output produced the marginal benefit of national defense exceeds the marginal cost of national defense; there is an under allocation of resources to national defense. The government could assume production of national defense and tax all members of the society to pay for the national defense. Or, a per-unit subsidy to private producers would lead to an increase in the output of national defense.

## Grading Rubric:

6 Points = 3 in part a + 3 in part b

(a) Chemical industry and pollution **(3 points)**

(i) Acceptable answers include: **(1 point)**

- Too much output
- Over allocation of resources to the market
- Showing higher than efficient output on graph

Acceptable answers include: **(1 point)**

- $MSC > MSB$  at the unregulated output
- $MSC > MPC$
- $MC > MB$  with term “negative externality”

(ii) Acceptable answers include: **(1 point)**

- Tax on output
- Quantity restriction
- Permits
- Liability and lawsuit

(b) National Defense (3 points):

(i) Acceptable answers include: (1 point)

Too little produced

Under allocation of resources

Showing lower than efficient output on graph

Acceptable answers include: (1 point)

$MSB > MSC$  at the unregulated output

$MSB > MPB$

Free-rider problem

(ii) Acceptable answers include: (1 point)

Public production of national defense

Tax to finance public production of national defense

Subsidy, if there are private producers of national defense

**Commentary:**

We began this question reminding students that an efficient allocation of resources occurs when the marginal social cost equals the marginal social benefit. Students then had to assess two situations in which an efficient allocation of resources does not occur and to explain why inefficiency exists.

## #2

### Correct Answer:

- (a) As shown on the graph,  $P_2$  and  $Q_2$  were the price and quantity of oil before trade in the US market.
- (b) The amount of oil imported into the US market after trade would be equal to  $Q_3 - Q_1$ . US production drops to  $Q_1$  but quantity demanded rises to  $Q_3$ .
- (c) The triangle  $P_2KG$  represents consumer surplus before trade, while triangle  $P_WKH$  represents consumer surplus after trade.
- (d) The triangle  $P_1P_2G$  represents producer surplus before trade, while triangle  $P_1P_WJ$  represents producer surplus after trade.
- (e) The triangle  $JGH$  shows the net gain in total surplus from trade.

### Scoring Guidelines: 8 points (2+1+2+2+1)

(a) 2 points: (Pre-trade)

1 - Identifying  $P_2$

1 - Identifying  $Q_2$

(b) 1 point: (Imports) Identifying  $(Q_3 - Q_1)$  or  $(H - J)$

(c) 2 points: (Consumer surpluses)

1 - Identifying  $P_2KG$  (before)

1 - Identifying  $P_WKH$  (after)

(d) 2 points: (Producer surpluses)

1 - Identifying  $P_1P_2G$  (before)

1 - Identifying  $P_1P_WJ$  (after)

(e) 1 point: (Net gain in surplus) Identifying  $JGH$