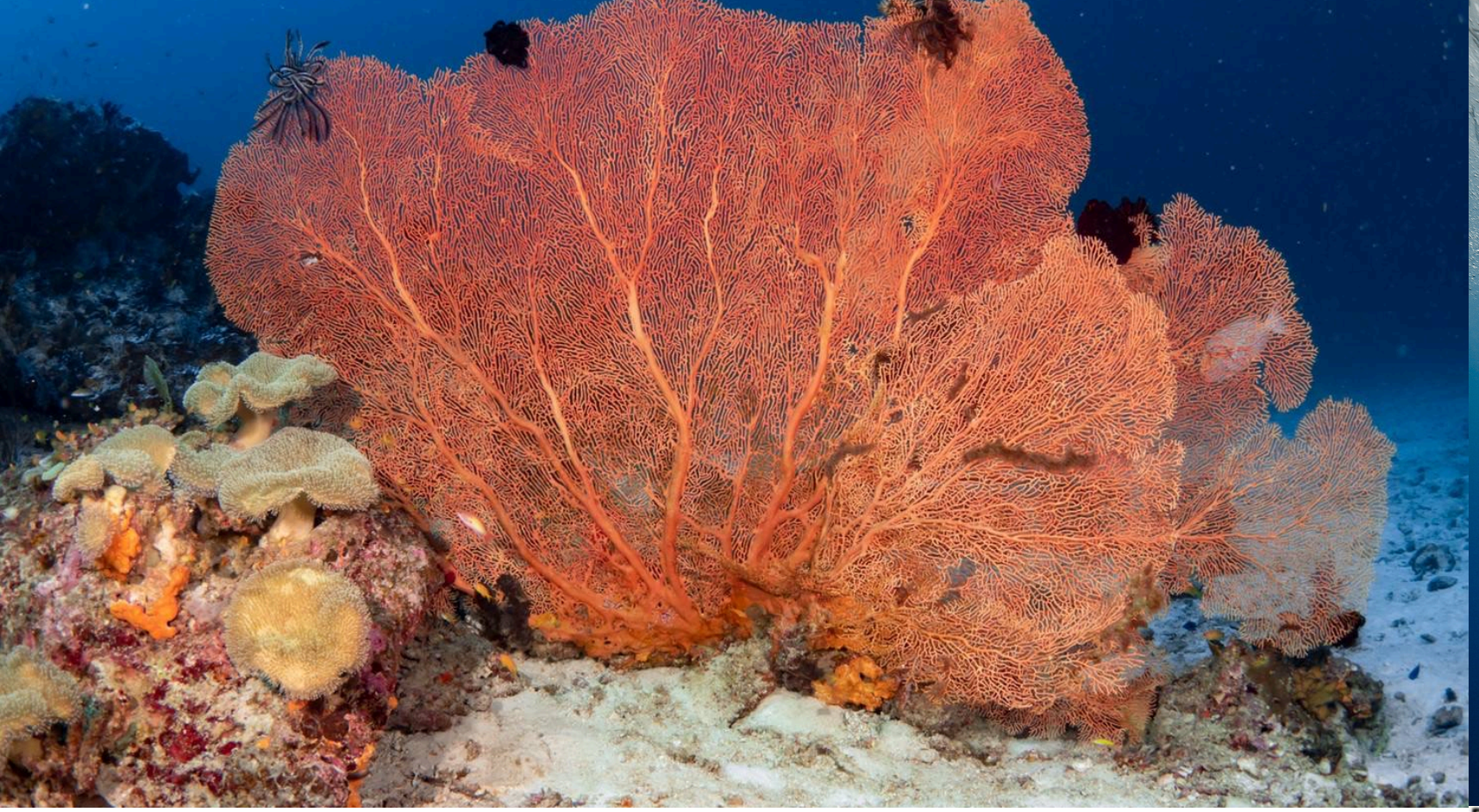
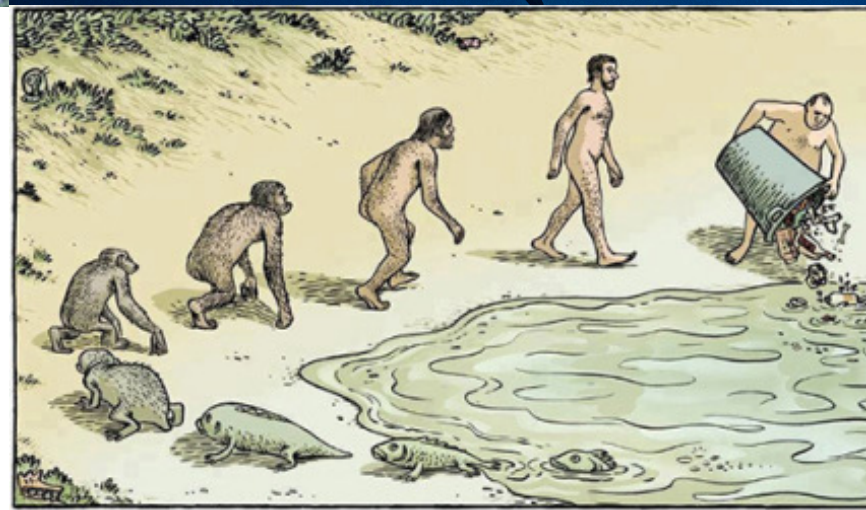


EE476
Environmental Economics

Lecture 3

2022



THE THEORY OF EXTERNALITIES

- Externalities is arising when the actions of some individuals have direct effects on the welfare or utility of other individuals, none of whom have direct control over that activity.

- Externalities can be either positive or negative.

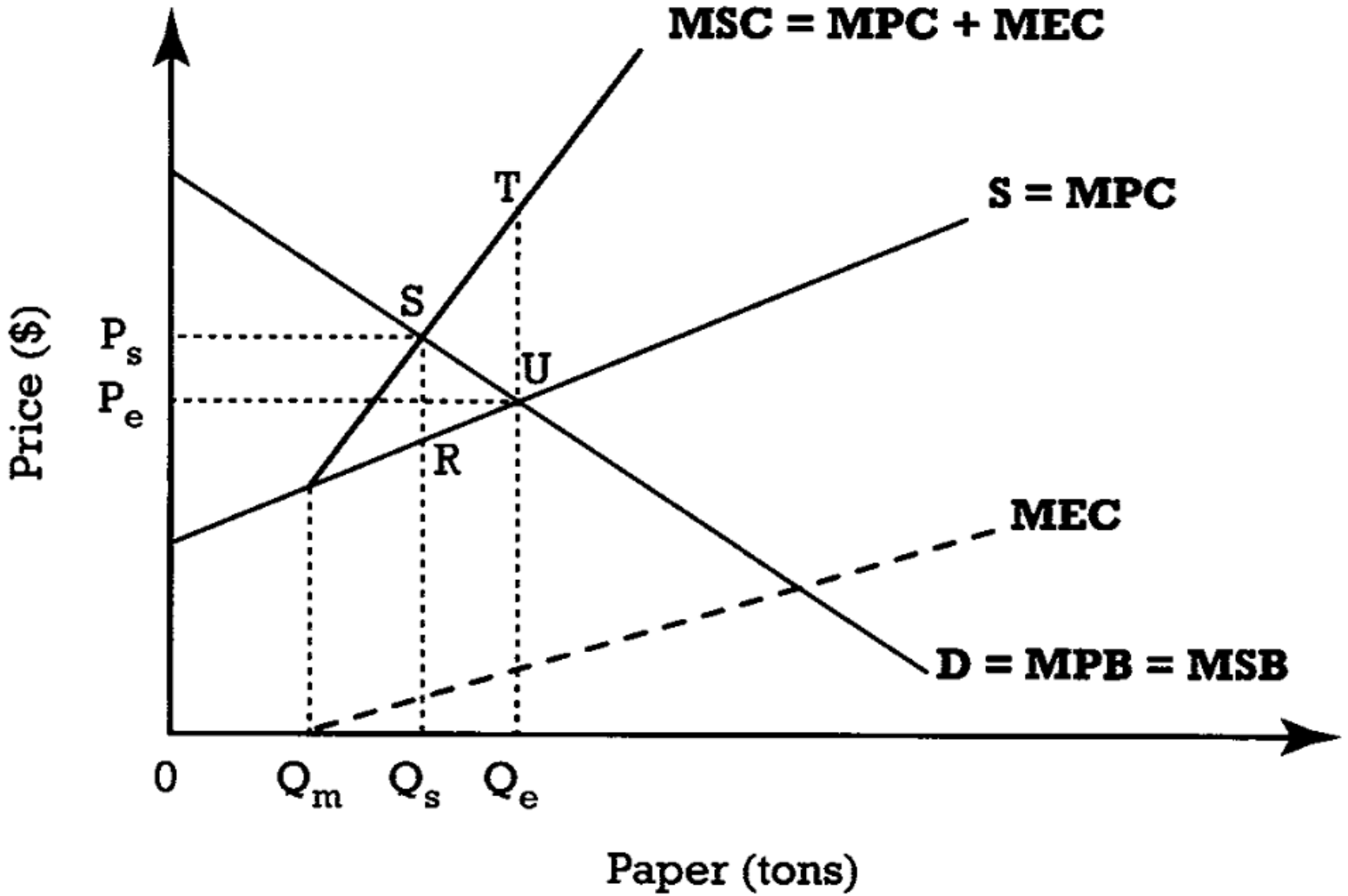
- In a situation where a *positive externality* is present

  Social benefits = Private benefits + External benefits

- In a case where *negative externality* prevails

  Social costs = Private costs + External costs

Optimal level of production with negative externalities



Market outcome : Q_e

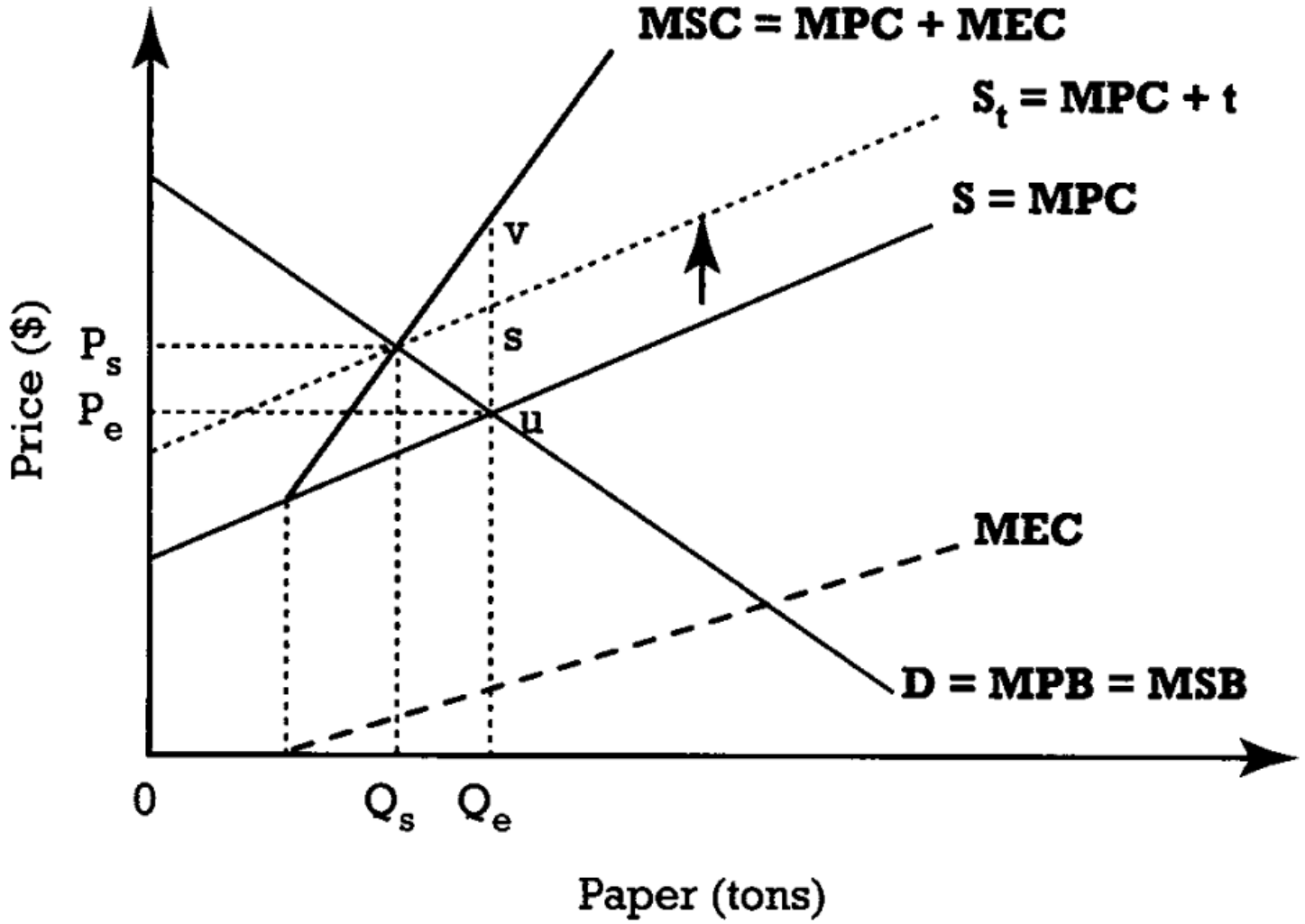
Social planner : Q_s

Incentivise producers to produce at the socially optimal level.

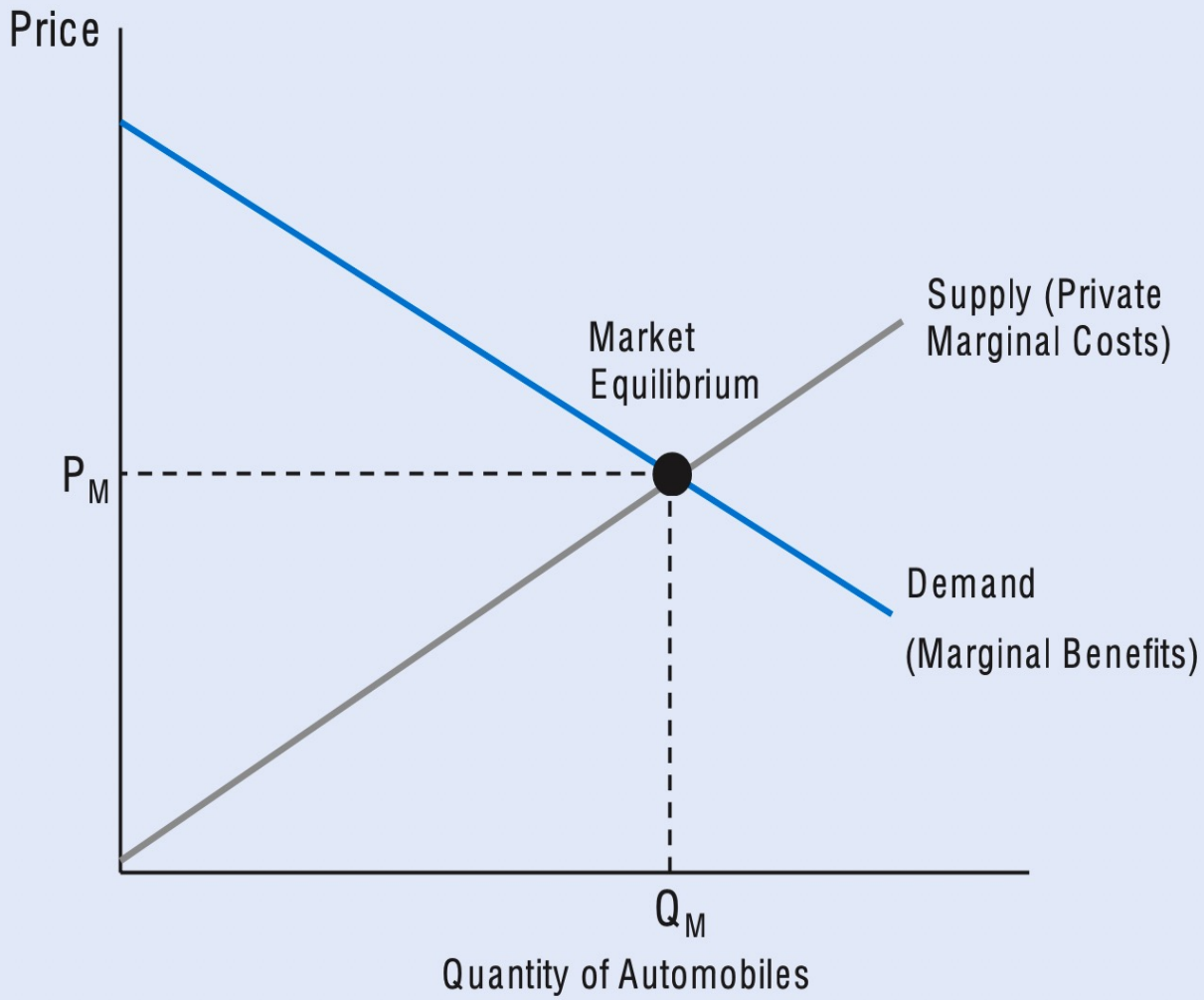
- **Polluter pays principle** the view that those responsible for pollution should pay for the associated external costs, such as health costs and damage to wildlife habitats.

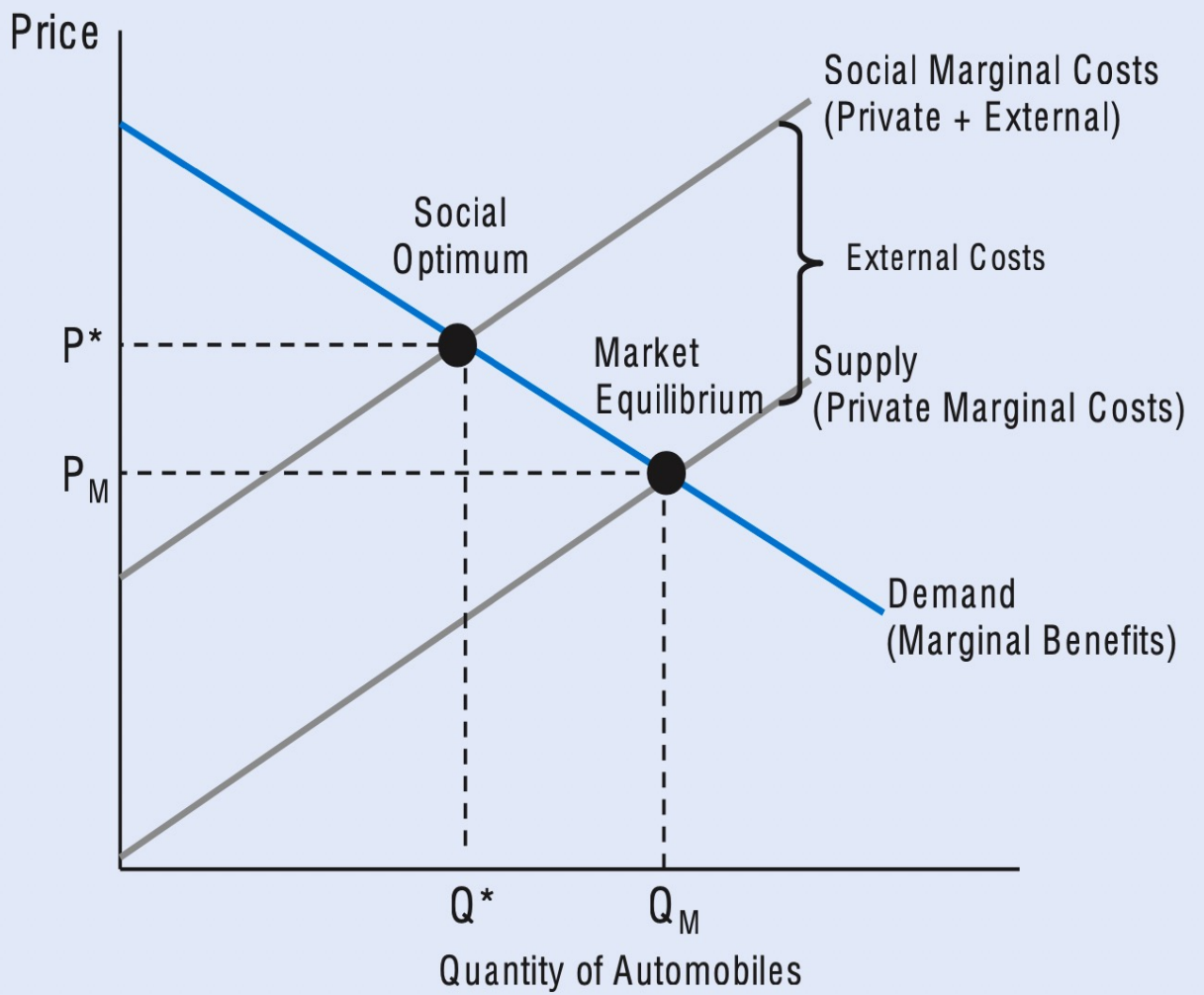
- **Pigovian (pollution) tax** a per-unit tax set equal to the external damage caused by an activity, such as a tax per ton of pollution emitted equal to the external damage of a ton of pollution.

Incentivise producers to produce at the socially optimal level.

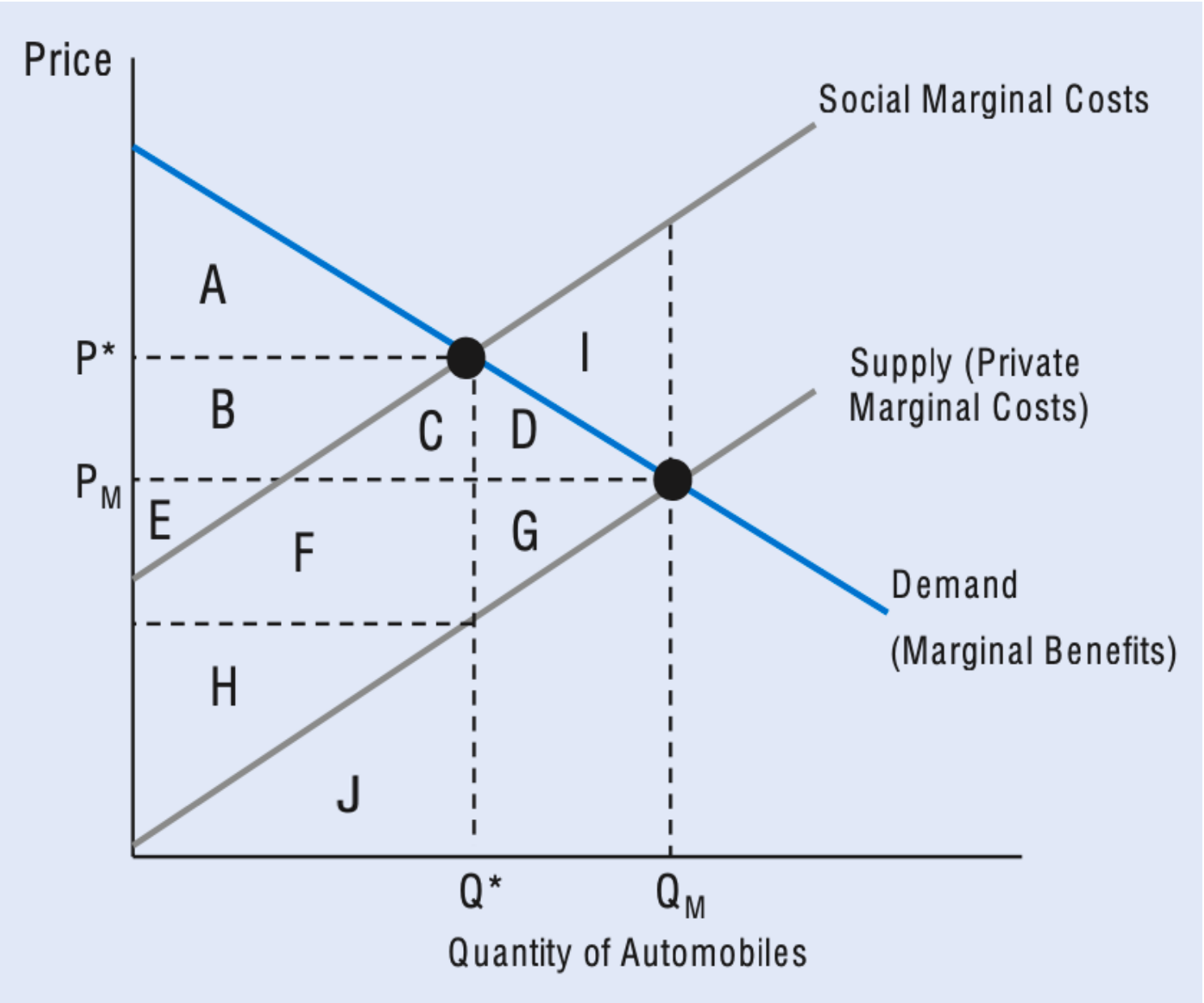


THE THEORY OF EXTERNALITIES





Welfare analysis : Q_M VS Q*



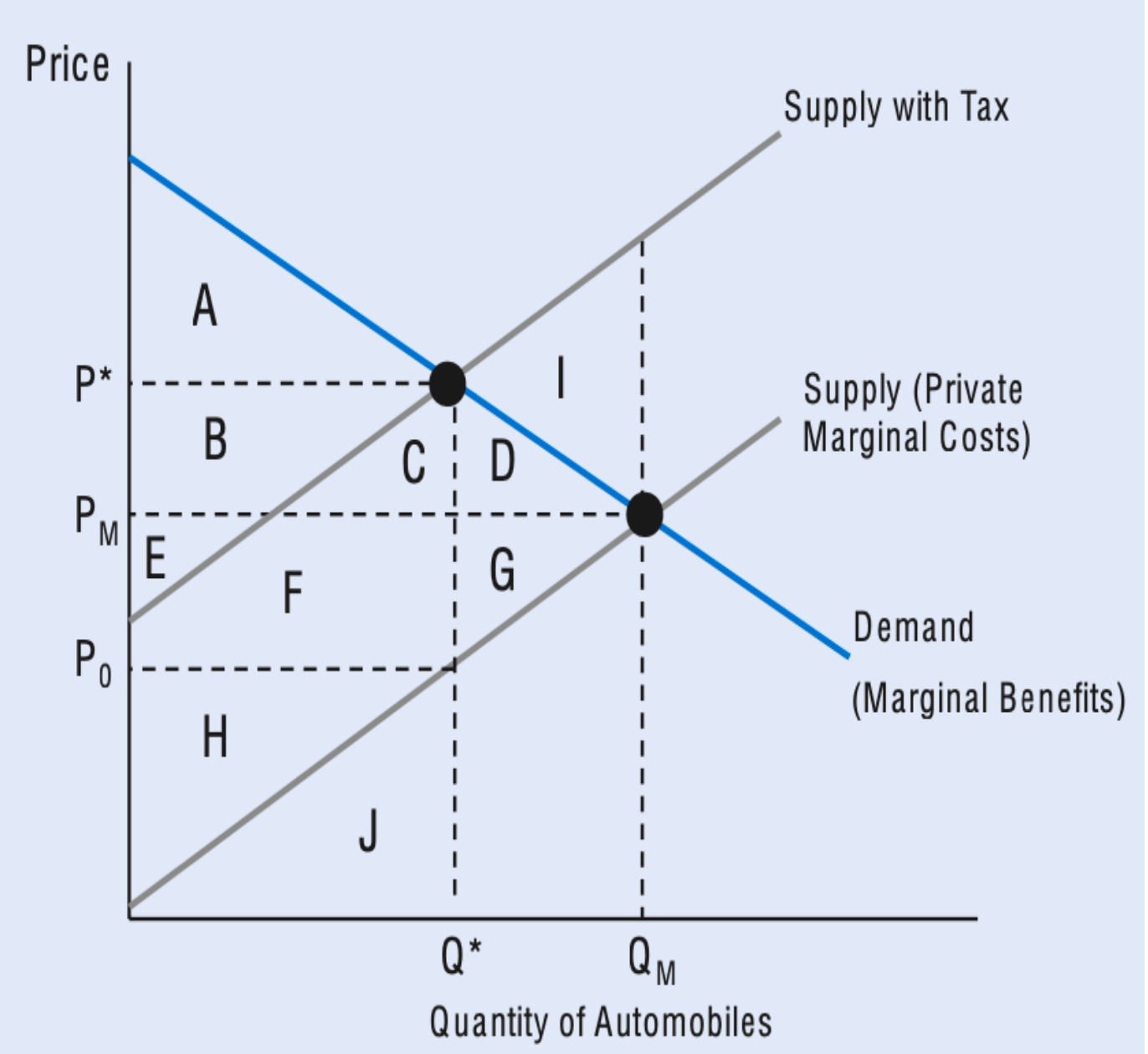
Market outcome

- CS =
- PS =
- External cost =
- SW =

Social planner

- CS =
- PS =
- External cost =
- SW =

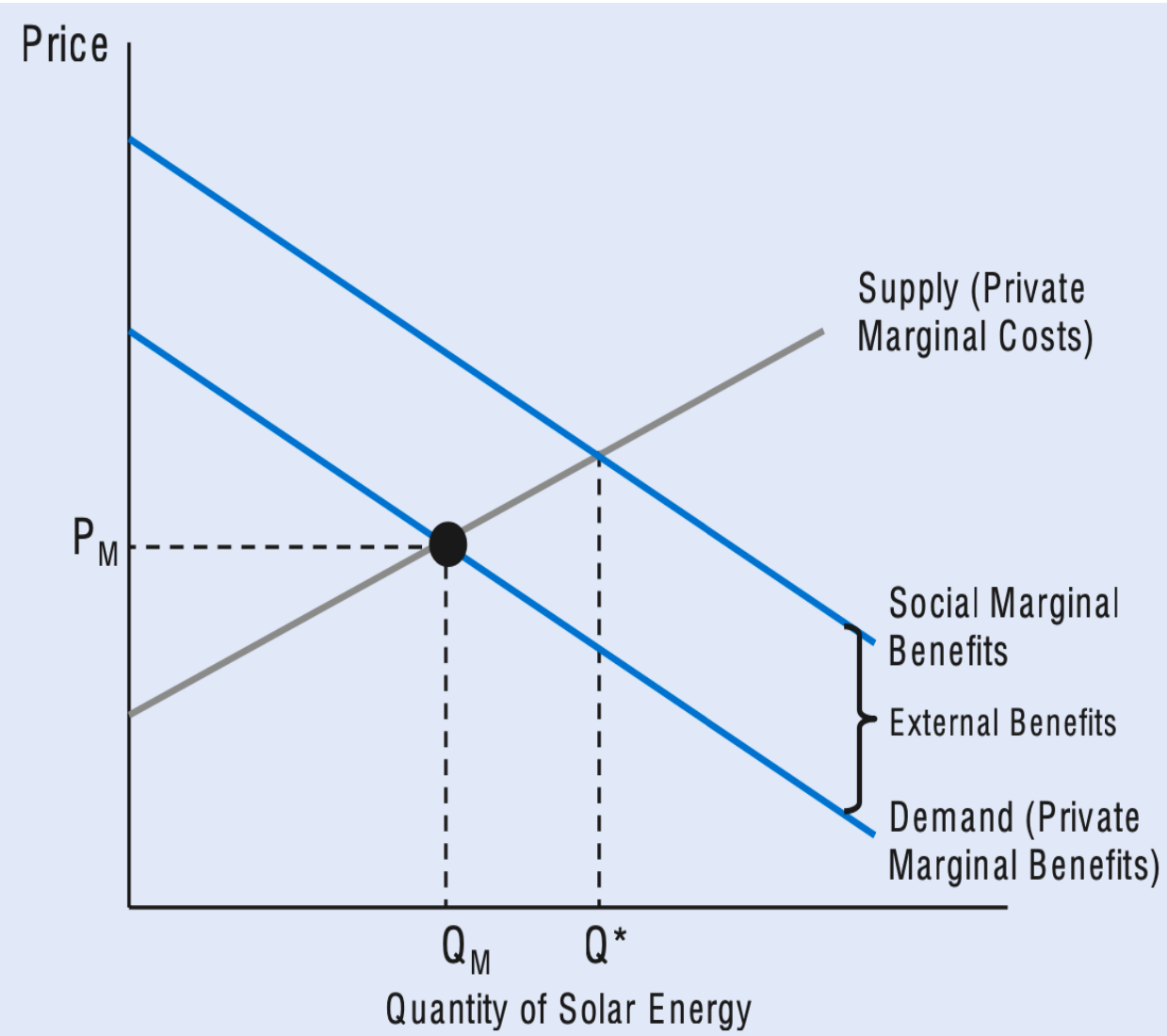
Welfare analysis : Q_M VS Q*

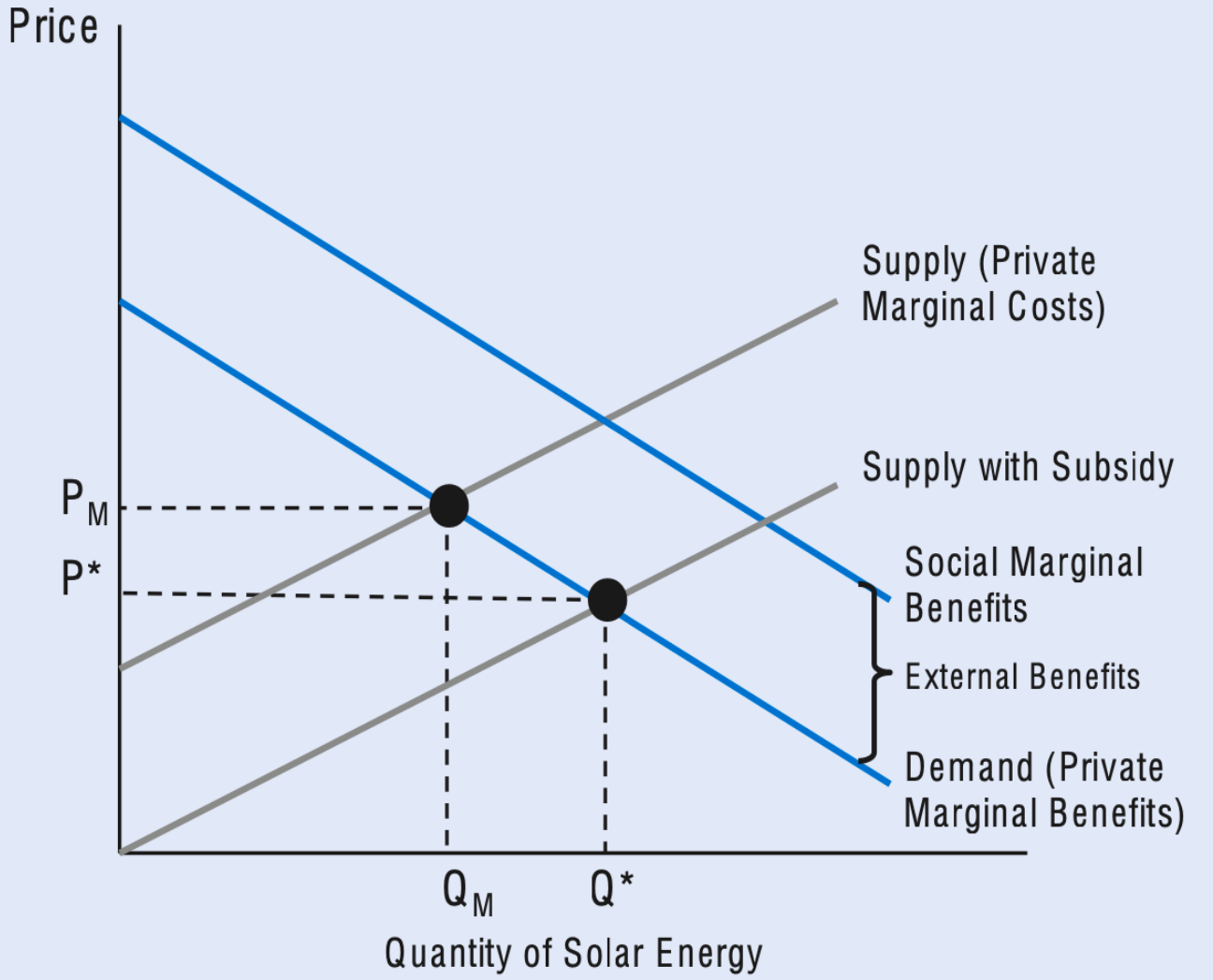


Market outcome with tax

- CS =
- PS =
- External cost =
- Government revenue =
- SW =

Optimal level of production with positive externalities





3. (If Appendix 3.2 is covered, "Negative Externalities—A Mathematical Approach.") Suppose the demand curve for an electronic tablet is:

$$P_d = 200 - 3\,Q$$

where Q is the number demanded in thousands. The supply curve is:

$$P_s = 20 + 3\,Q$$

where, again, Q is measured in thousands. Production of the tablets, considering the materials used, the wastes created, transportation, and packing results in $30 of external costs per tablet.

a) Solve for the equilibrium price and quantity in the tablet market without any regulation, both algebraically and using a supply-and-demand graph.
b) What is total social welfare in the tablet market without any regulation? Solve for consumer surplus, producer surplus, and the externality damage algebraically. (Be careful about the units.) Also show these areas in your graph from part (a).
c) If the correct Pigovian tax is instituted, what will be the new equilibrium price and quantity in the tablet market? Solve algebraically and also show this on a graph (the same graph from above or a new graph).
d) What is total social welfare in the tablet market with the correct Pigovian tax? Solve for consumer surplus, producer surplus, the externality damage, and the tax revenues algebraically. Also show these areas in your graph from part (c).