

LECTURE 10
EXTERNALITIES
February 15, 2018

- I. OVERVIEW
 - A. Market failures
 - B. Definition of an externality
- II. NEGATIVE EXTERNALITIES (EXAMPLE: GASOLINE)
 - A. Definition
 - B. New names for old concepts
 - C. Social marginal cost
 - D. The private outcome versus the socially optimal outcome
 - E. Welfare analysis of a negative externality
 - F. Other examples of negative externalities
- III. POSITIVE EXTERNALITIES (EXAMPLE: VACCINES)
 - A. Definition
 - B. Social marginal benefit
 - C. The private outcome versus the socially optimal outcome
 - D. Welfare analysis of a positive externality
 - E. Other examples of positive externalities
- IV. REMEDIES FOR EXTERNALITIES
 - A. Private solutions
 - B. Government regulation
 - C. Taxes and subsidies

Economics 2
Spring 2018

Christina Romer
David Romer

LECTURE 10

Externalities



February 15, 2018

Announcements

- **Midterm 1 Logistics:**
 - If your GSI is Maxime Sauzet (Sections 103 & 104) or Wesley Huang (Sections 111 & 112) go to **10 Evans**.
 - If your GSI is Todd Messer (Sections 107 & 108) go to **101 Life Sciences Addition**.
 - Everyone else come to usual room (**2050 VLSB**).

Announcements

- DSP Students:

- You should have received an email from the course assistant (Todd Messer) about arrangements. If you haven't, please contact him (messertodd@berkeley.edu).

- Review Session:

- Friday, February 16, 4 –6 p.m. in 2050 VLSB.

I. OVERVIEW

Market Failure

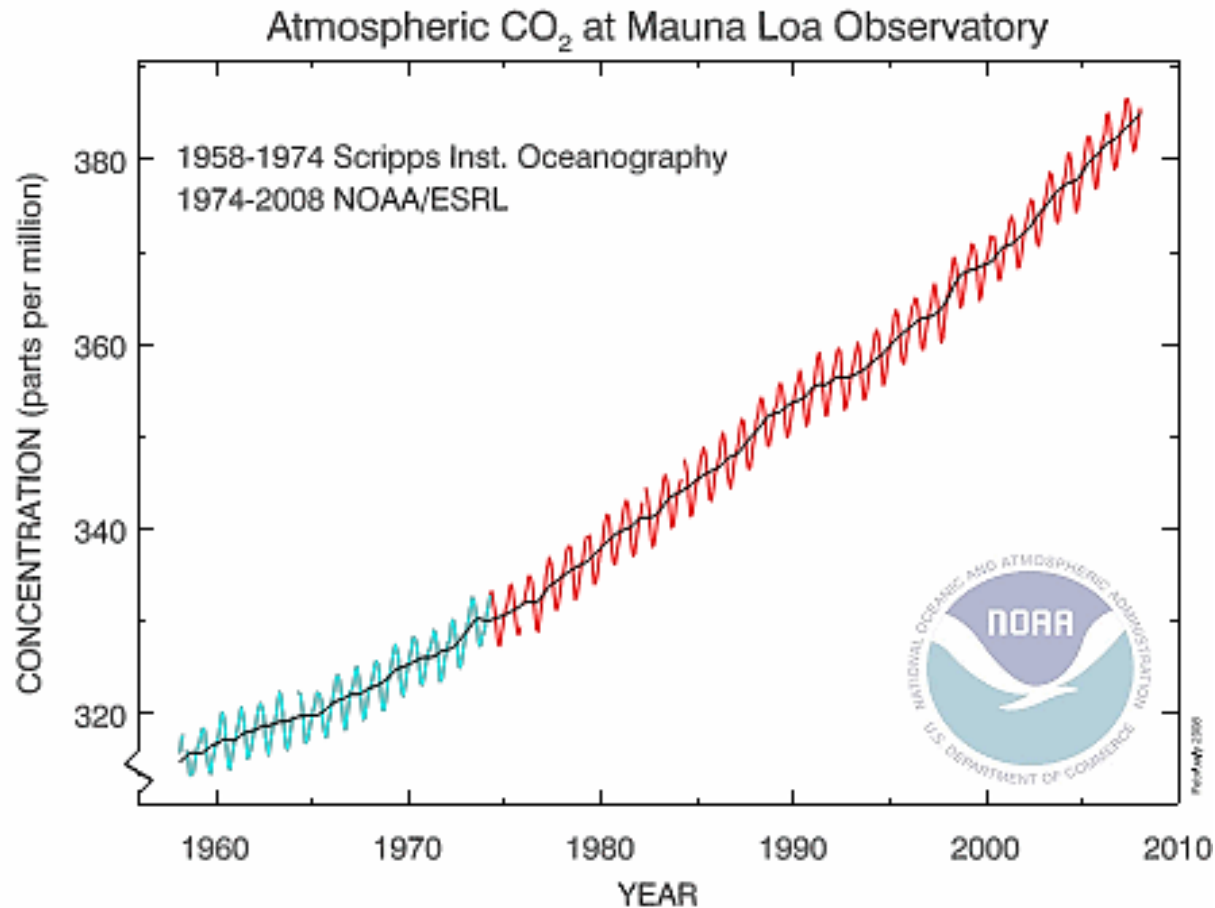
- When markets do not work well; there is some defect.
- First example was monopoly—a profound lack of competition.

Externality

- An effect related to the production or consumption of a good that falls on people who are not the producers or consumers.

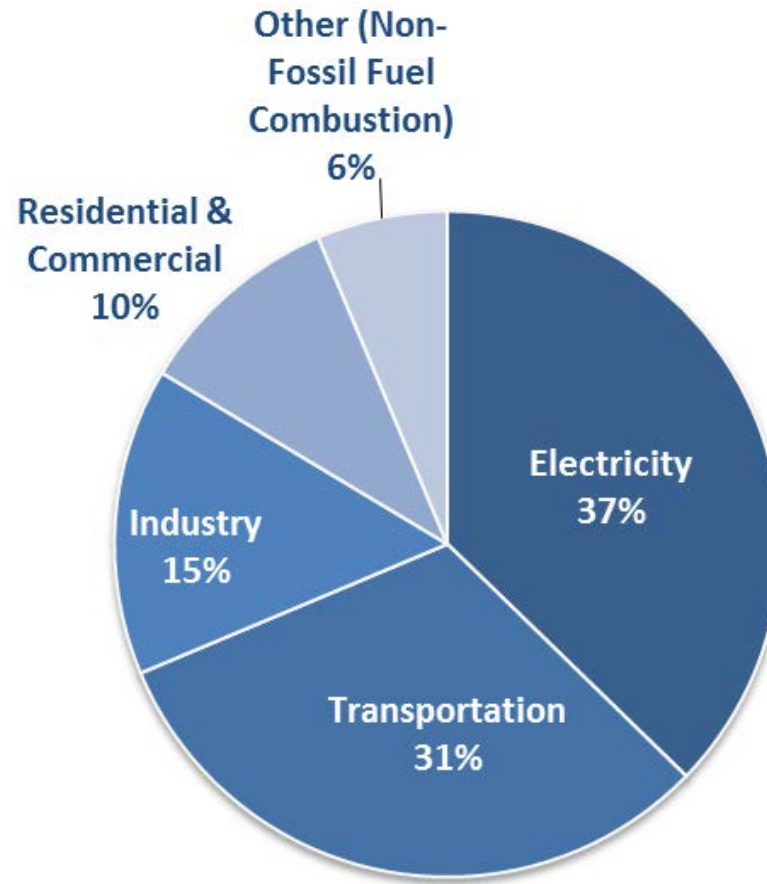
II. NEGATIVE EXTERNALITIES

Atmospheric CO₂ Concentration



Source: National Oceanic and Atmospheric Administration.

U.S. Carbon Dioxide Emissions, By Source

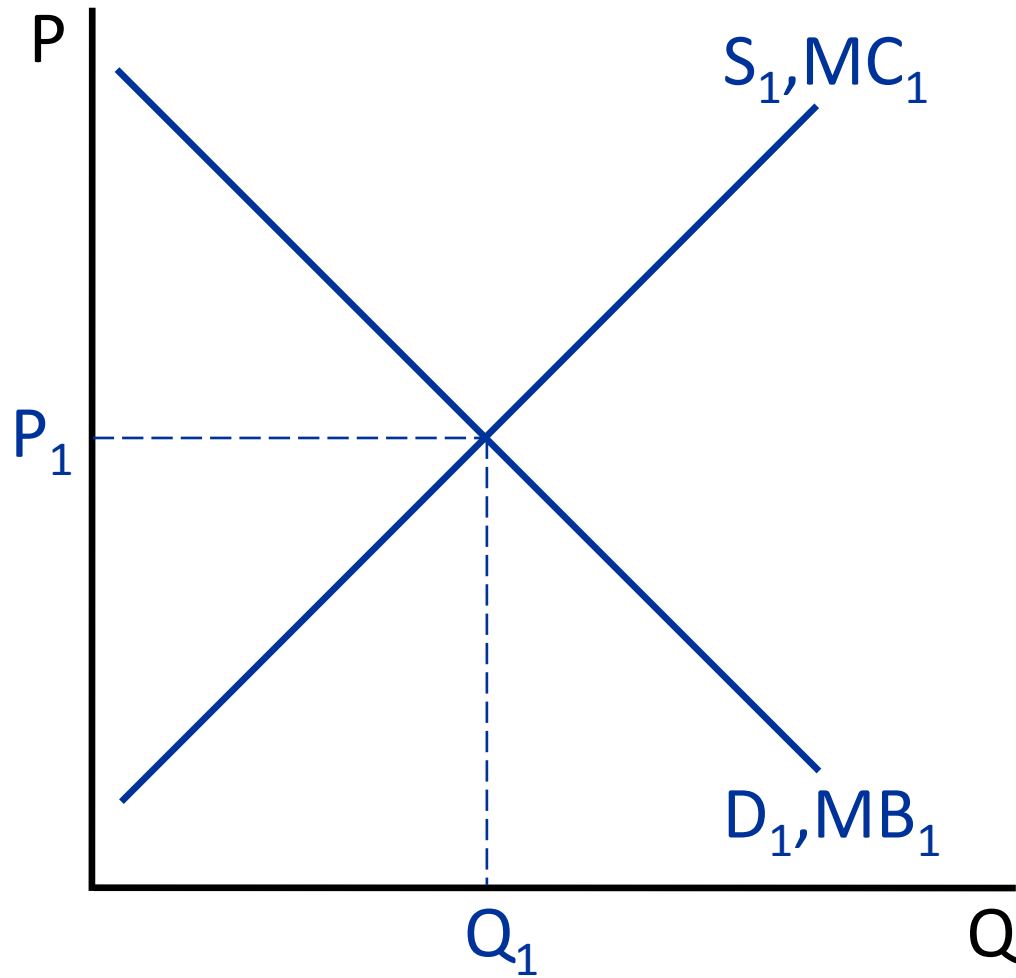


Source: Environmental Protection Agency.

Negative Externality

- The effects on those outside the market are bad.
- There is an external cost.
- Negative externalities can result from either the consumption or the production of a good (or both).

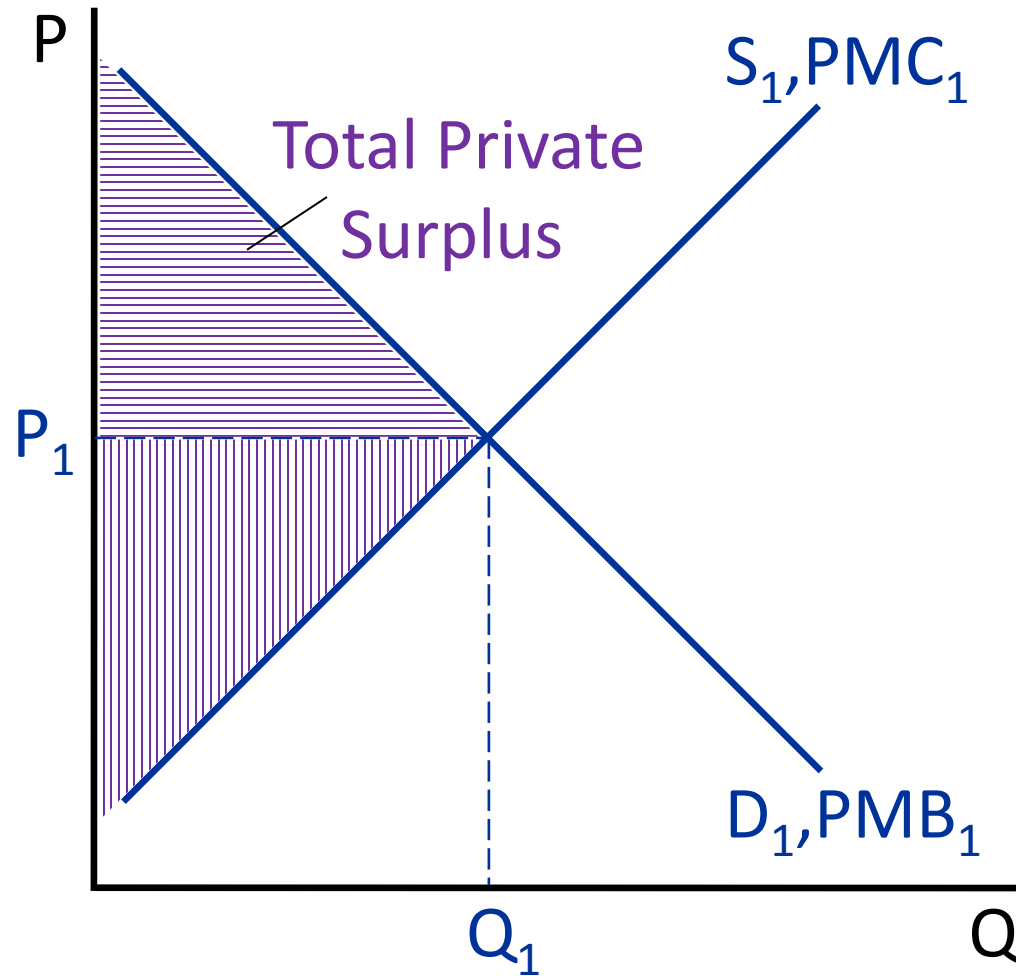
Market for Gasoline



Some Terminology

- “Private” refers to people participating in the market (the buyers and sellers).
- “Social” includes effects on people both in the market and outside the market.

Review of Welfare Analysis



PMC is the private marginal cost; PMB is the private marginal benefit.

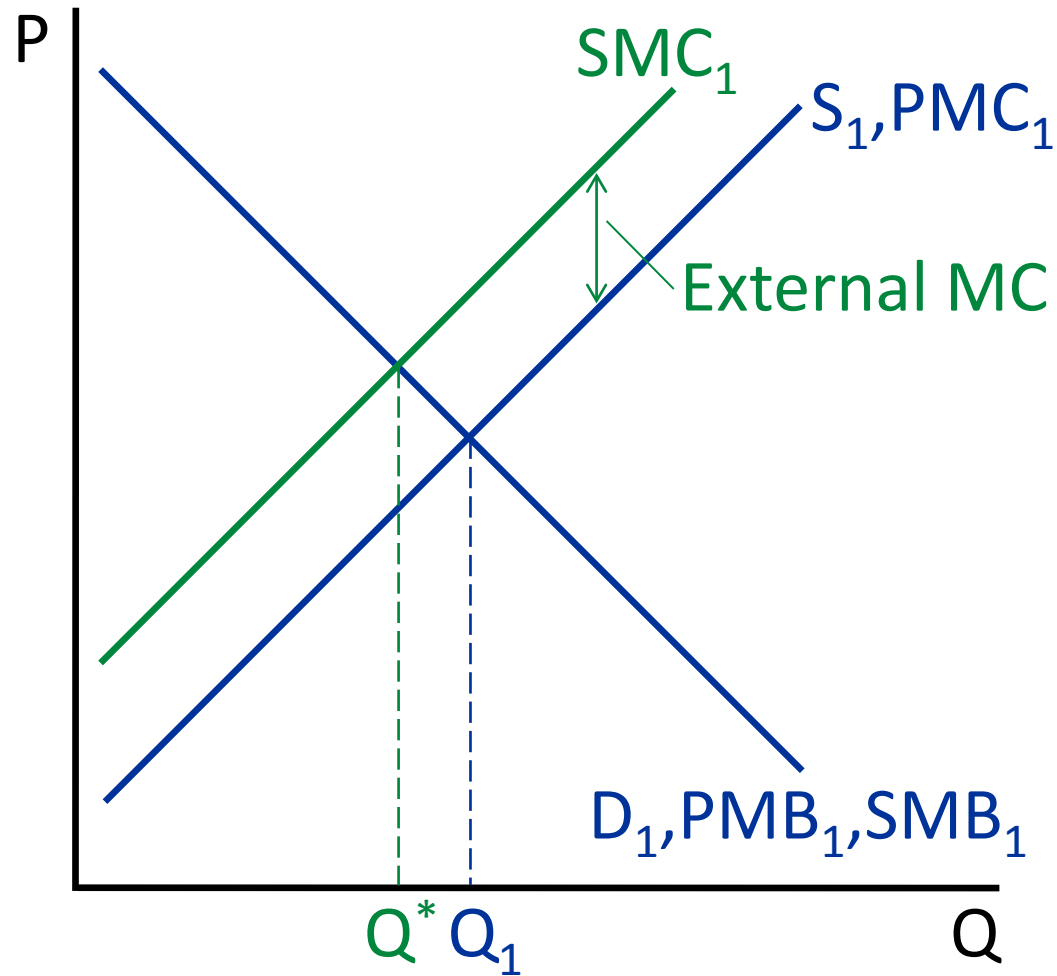
Total Private Surplus

- Sum of consumer surplus and producer surplus.
- It is the area between the PMB and PMC, up to the level produced and consumed.

More Terminology

- **External Marginal Cost:** The additional cost to people outside the market when one more unit is produced and consumed.
- **Social Marginal Cost:** Private marginal cost plus external marginal cost.

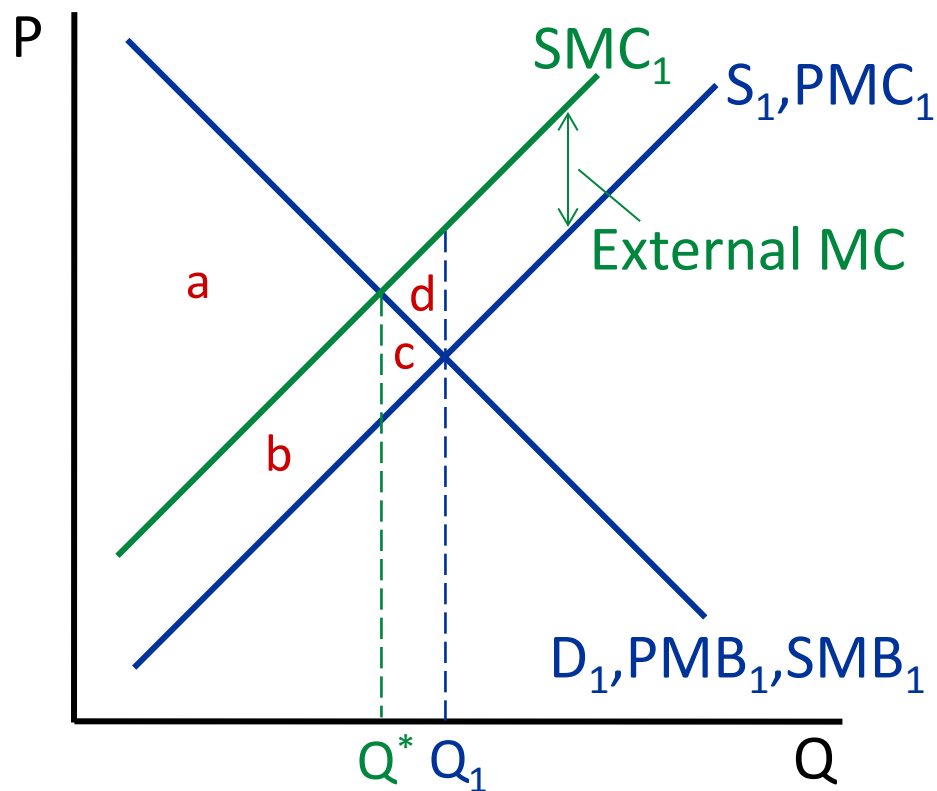
Negative Externality (Market for Gasoline)



Total Social Surplus

- Total private surplus plus external benefits minus external costs.
- It includes the welfare of both people in the market and outside the market.

Welfare Analysis of a Negative Externality



	Q_1	Q^*
Total Private Surplus	$a+b+c$	$a+b$
External Costs	$-(b+c+d)$	$-b$
Total Social Surplus	$a-d$	a
Deadweight Loss	d	

When is the total social surplus as large as possible?

- The total social surplus is largest at the quantity where $SMB=SMC$.
- Why is this the case?
- Any shortfall from the largest total social surplus is the deadweight loss.

Some Points about the Welfare Analysis of a Negative Externality

- The total social surplus includes the people in the market.
- The total social surplus typically isn't maximized at very low levels of production and consumption.
- When there is no externality, SMB and PMB are the same, and SMC and PMC are the same.
 - The market produces where $PMB = PMC$, which is the same as where $SMB = SMC$.

Other Examples of Negative Externalities?

- Second-hand smoke from cigarettes.
- Texting or drinking and driving.
- Pesticide runoff from farms.
- Noise related to a construction project.

Whenever There Is a Negative Externality:

- The SMC curve lies above the PMC curve.
- The people in the market will choose to produce where $PMC = PMB$ (or supply is equal to demand).
- But society would be better off if the market produced and consumed *less* (where $SMC = SMB$).

III. POSITIVE EXTERNALITIES

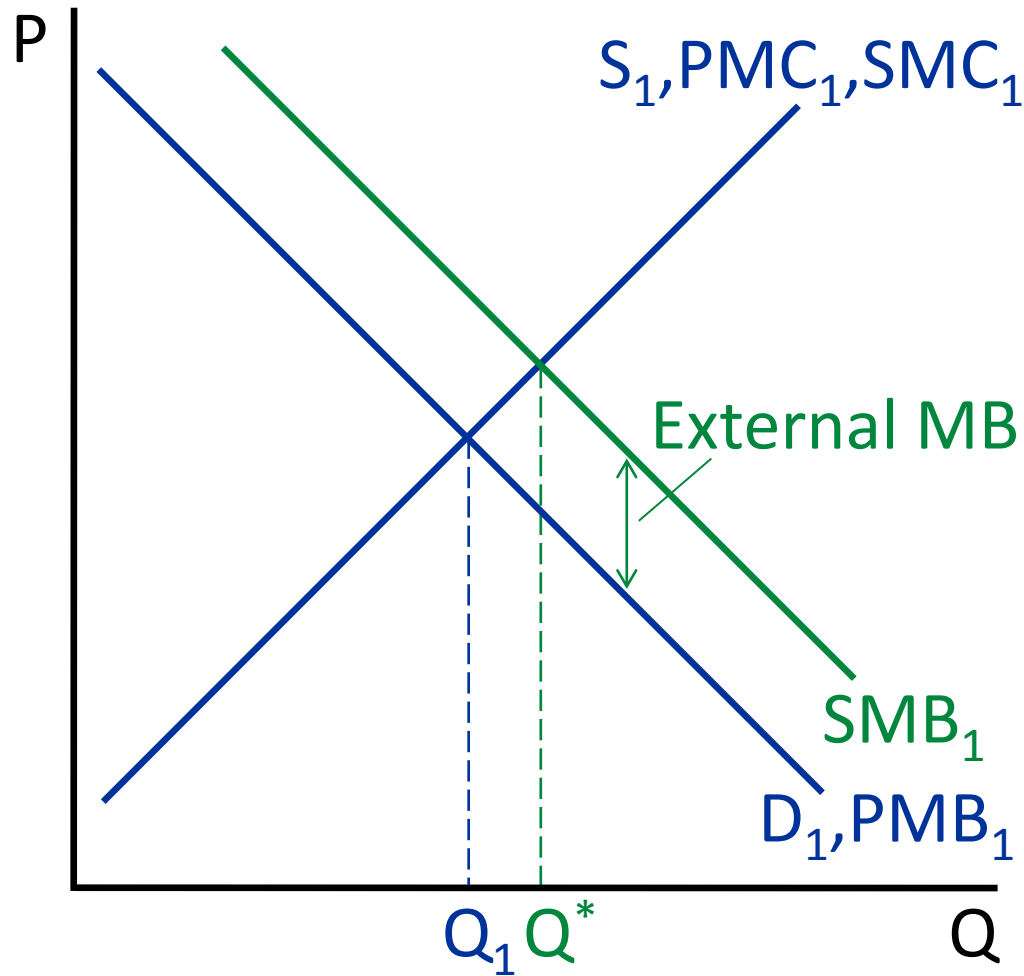
Positive Externality

- The effects on those outside the market are good.
- There is an external benefit.
- Positive externalities can result from either the consumption or the production of a good (or both).

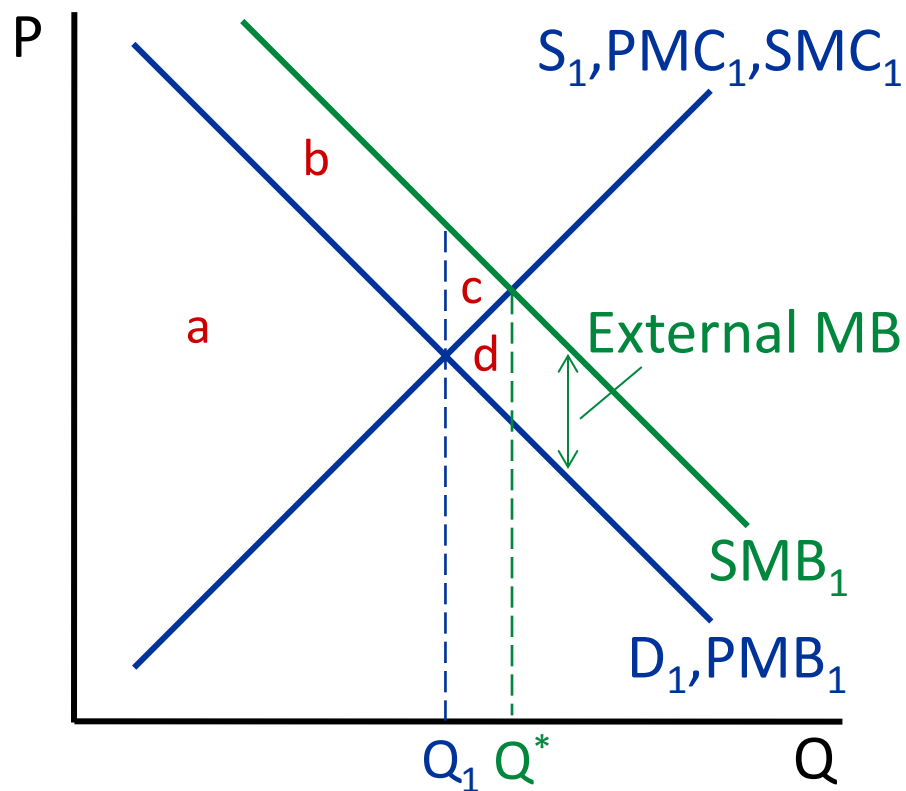
More Terminology

- **External Marginal Benefit:** The additional benefit to people outside the market when one more unit is produced and consumed.
- **Social Marginal Benefit:** Private marginal benefit plus external marginal benefit.

Positive Externality (Market for Vaccines)



Welfare Analysis of a Positive Externality



	Q_1	Q^*
Total Private Surplus	a	a-d
External Benefits	b	b+c+d
Total Social Surplus	a+b	a+b+c
Deadweight Loss	c	

Other Examples of Positive Externalities?

- Technology spillovers.
- Education.
- Planting flowers in your yard.

Whenever There Is a Positive Externality:

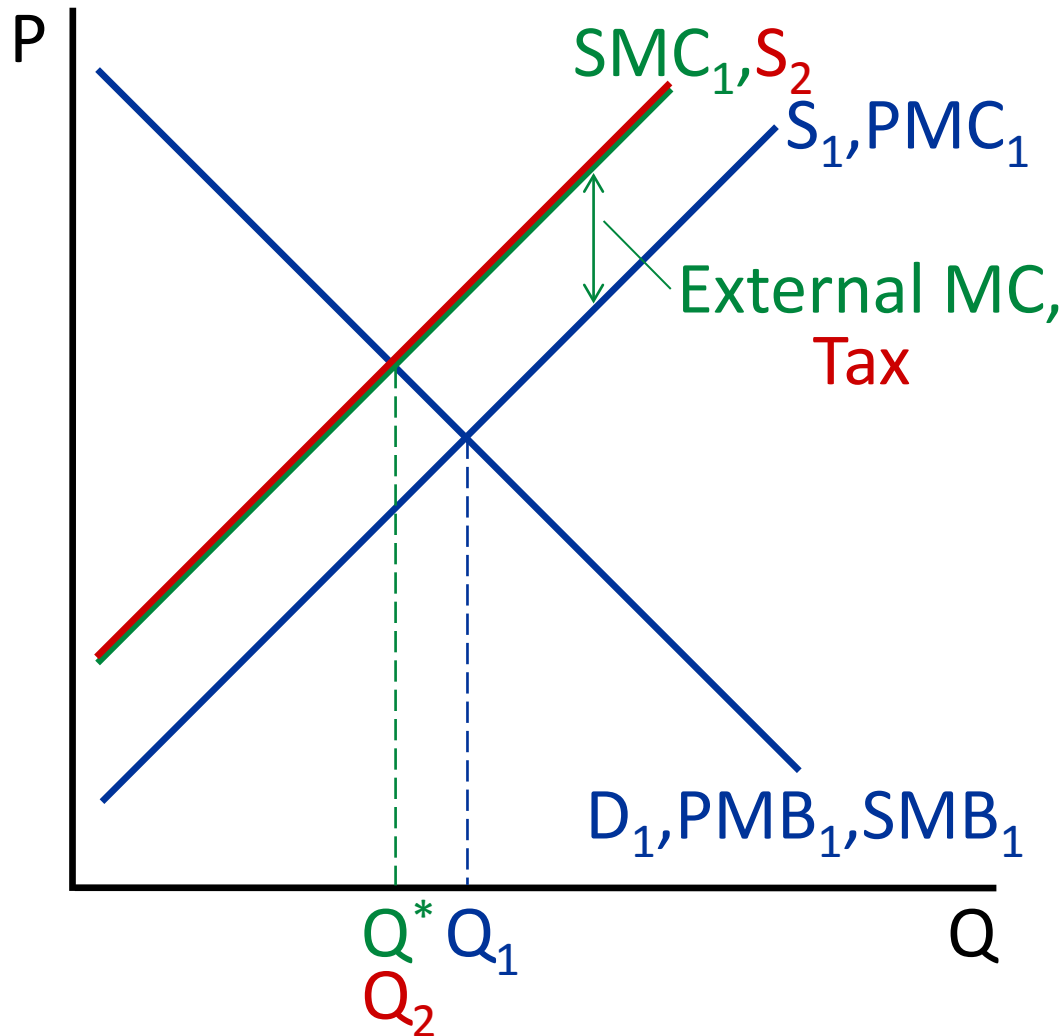
- The SMB curve lies above the PMB curve.
- The people in the market will choose to produce where $PMC=PMB$ (or supply is equal to demand).
- But society would be better off if the market produced and consumed *more* (where $SMC=SMB$).

IV. REMEDIES FOR EXTERNALITIES

Remedies for Externalities

- Private Solutions:
 - Negotiation and compensation.
 - Social sanctions.
- Government Regulation
- Taxes and Subsidies

Remedy for a Negative Externality (Tax)



Remedy for a Positive Externality (Subsidy)

