

## ch 16 Externalities

- An Example of how and why markets fail

Generally, will require government intervention

Some Concepts

External Cost : an uncompensated cost that an individual or firm imposes on others  
e.g. pollution,  
smoking

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External benefit : a benefit

that an individual or firm confers on others without receiving compensation

e.g. technology spillover,  
preservation of farmland

Externalities : external costs  
and benefits

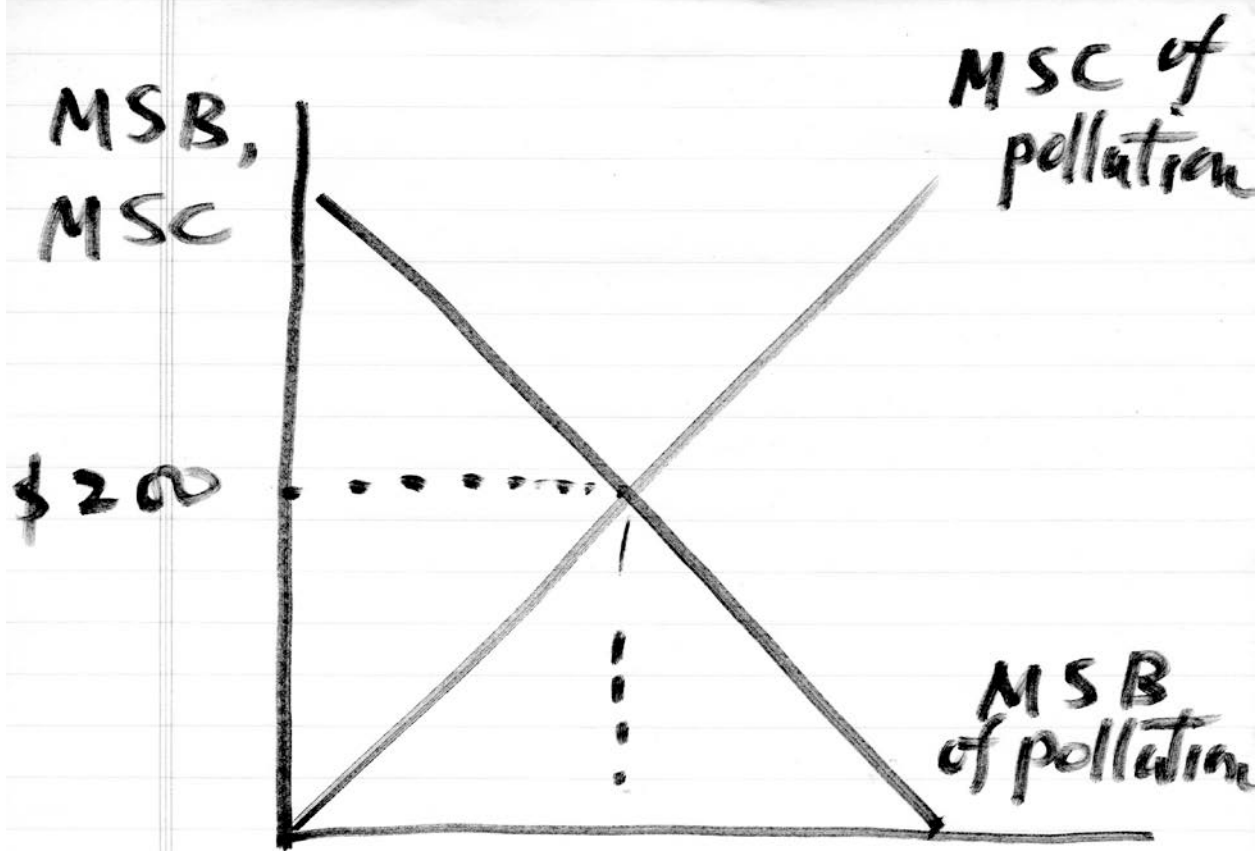
external costs : negative  
externalities

external benefits : positive  
externalities

## Pollution

Marginal Social Cost (MSC) of pollution: additional cost imposed on society as a whole by an additional unit of pollution

Marginal social benefit (MSB) of pollution: additional benefit to society from an additional unit of pollution e.g. how much power companies save if allowed to emit an additional ton of  $SO_2$



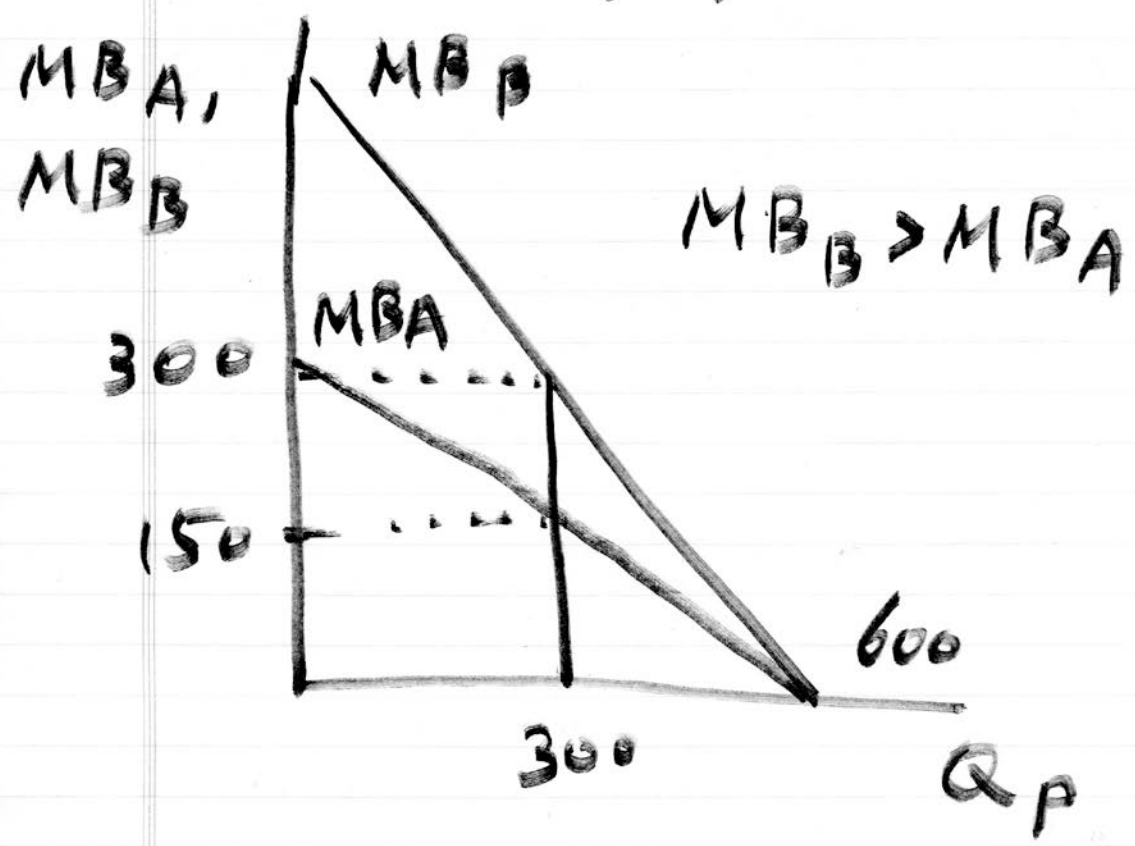
$Q_{opt}$  of pollution emissions

$Q_{MKT}$   
market-determined  
quantity of  
pollution

## Policies towards Pollution

- (i) environmental standards: rules that protect the environment by specifying actions by producers/consumers
- (ii) emission tax: tax that depends on the amount of pollution a firm produces
- (iii) tradable emissions permits  
licences to emit limited pollution that can be bought and sold

# Environmental Standards

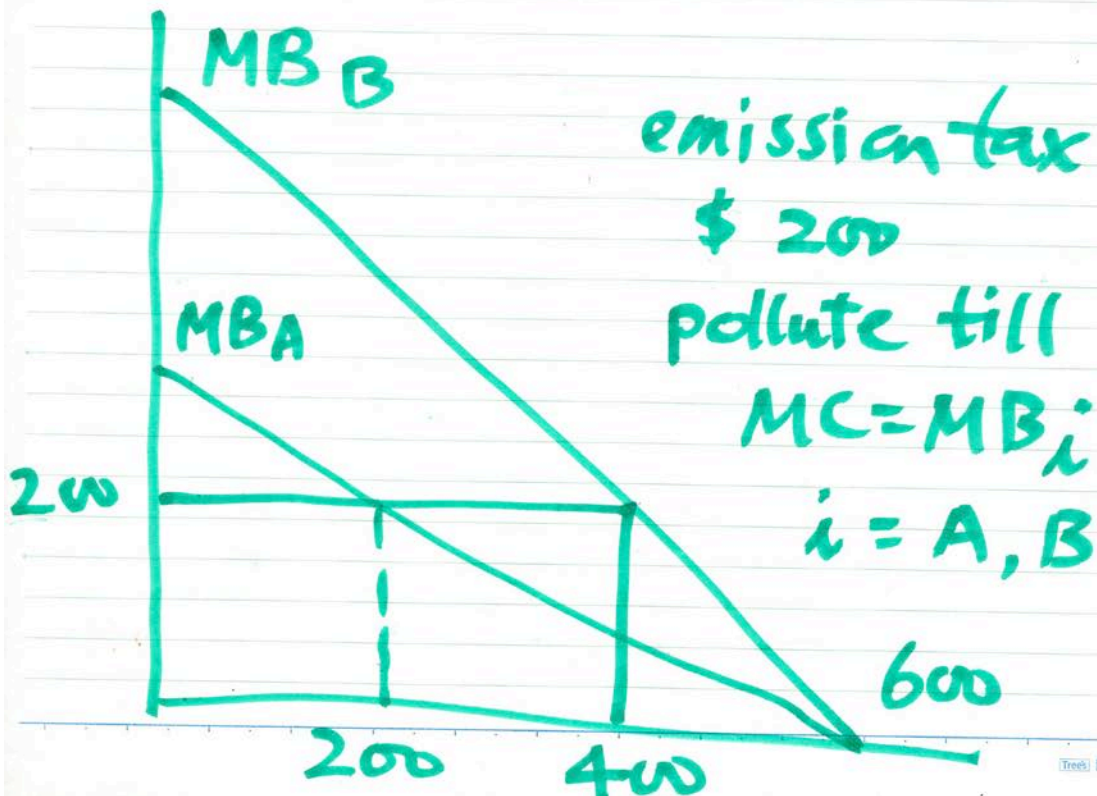


cost firm A less  
to reduce pollution

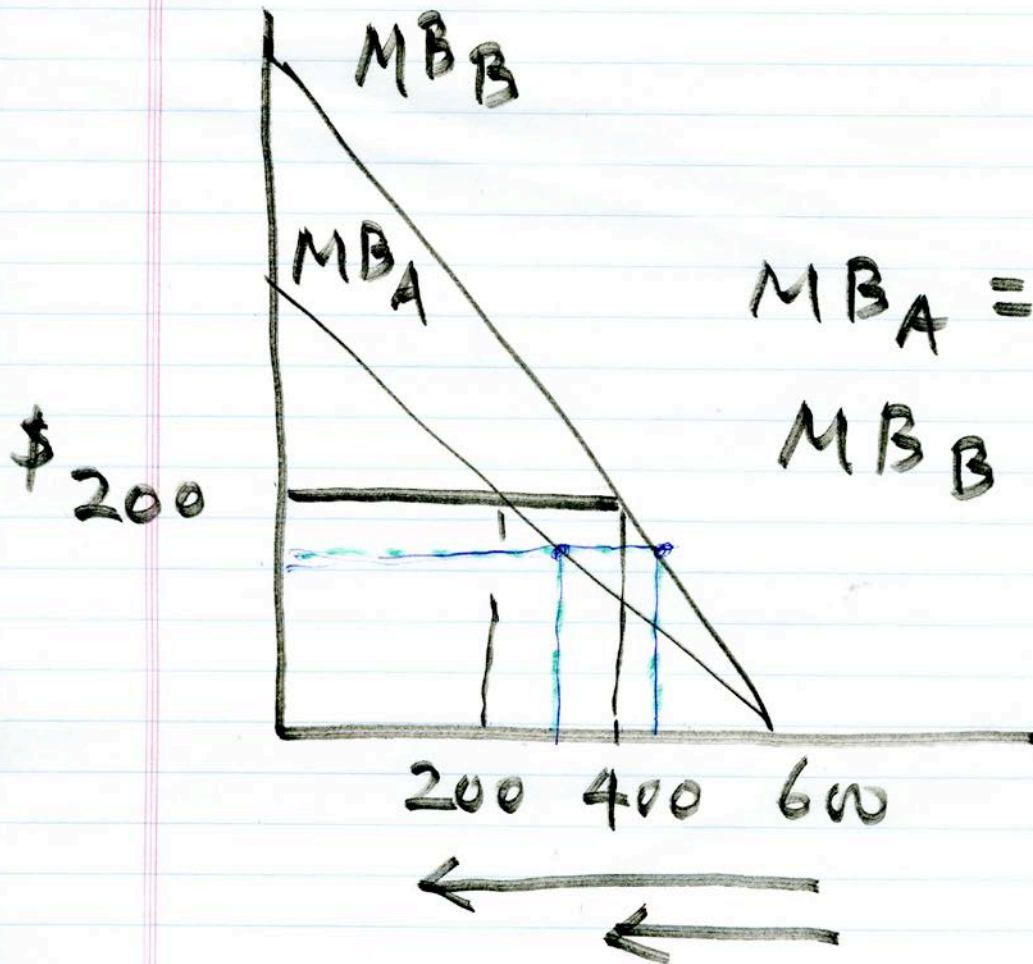
But  $MB_B > MB_A$

side deals would  
be mutually beneficial

## Emission taxes



# Emission Tax



Pigouvian tax: taxes designed to reduce external costs

Problem: have to know the exact tax rate



Pigouvian tax : taxes designed to reduce external costs

Tradable emission

permits : e.g. each polluting firm issued permits = 50% of its prior emission, but permits are tradable

# Tradable emissions

permits :

300 licences each to

firm A & firm B

(one licence  $\Rightarrow$  one ton of pollution)  $\leftarrow$  cap

firm A will sell permit

to B as long as  $MB_A <$

$MB_B$

the equilibrium price

of permit = \$200

still, have to know the

right cap

## Cap & Trade

US: SO<sub>2</sub> emissions  
Since 1994

EU: greenhouse gas  
emissions

US acid rain cap and  
trade: by 2010, 50%  
reduction in acid rain  
from 1980 levels

EU: covers all 27 member  
countries; in 2006, 1,101  
metric tons of emissions  
transacted

- Externalities can be positive or negative
- Negative externalities, e.g. pollution
- positive externalities, preserved farmland  
early childhood pre-school education
- Since 1961, New Jerseyans voted to subsidize farmers to permanently preserve their farmland

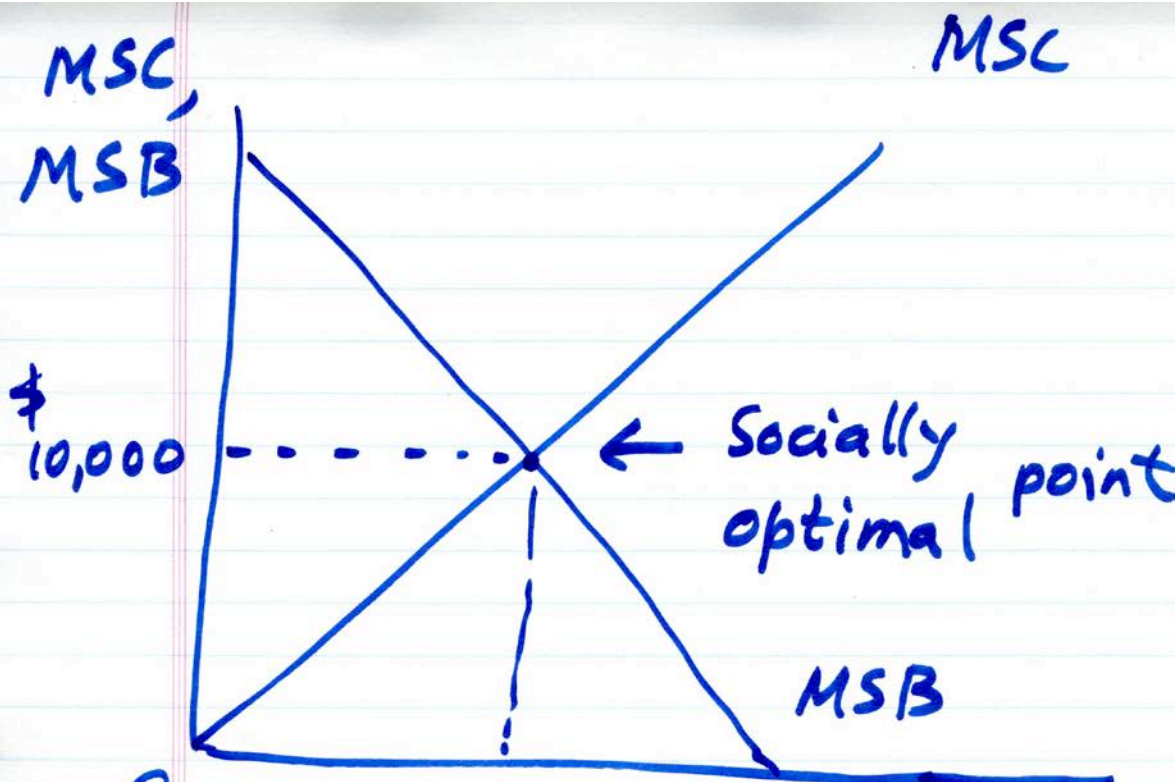
## Positive Externalities

MSC curve : additional cost imposed on society by an additional acre of such farmland

- foregone profits that would have accrued to farmers if they had sold their land to developers

MSB curve : marginal social benefit of preserved farmland

additional benefits accrued to society - farmer's neighbors



$Q_{MKT}$   
 |  
 Market-determined  
 quantity  
 of preserved  
 farmland

$Q$  of  
 preserved  
 farmland

\$ 10,000 - optimal Pigouvian  
 subsidy on farmland  
 preservation

- MSB includes natural beauty, access to fresh food, conservation of wild bird populations

- Socially optimal quantity of preserved farmland  $Q_{opt}$  occurs when  $MSB = MSC$

## Private Solutions

- Coase theorem

in the presence of externalities, an economy can be efficient if costs of making a deal are low

- Transaction Costs

- costs of communication
- costs of making legally binding agreements
- costly delays in bargaining