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# The Economics of Environmental Damage

Dr John Wilson

School of Commerce, University of South Australia

# Environmental problems have been with us a while...

- “doubling the CO<sub>2</sub> in the atmosphere will raise the Earth's temperature some 5-6°C”
  - Arrhenius (1896)
- “Governments should be urged to co-operate in preparing and carrying out a comprehensive scheme for the utilisation of the waters along the River Murray....with regard to the conservation and distribution of its waters”
  - Interstate Royal Commission on the River Murray, 1902

# The economic causes of environmental degradation?

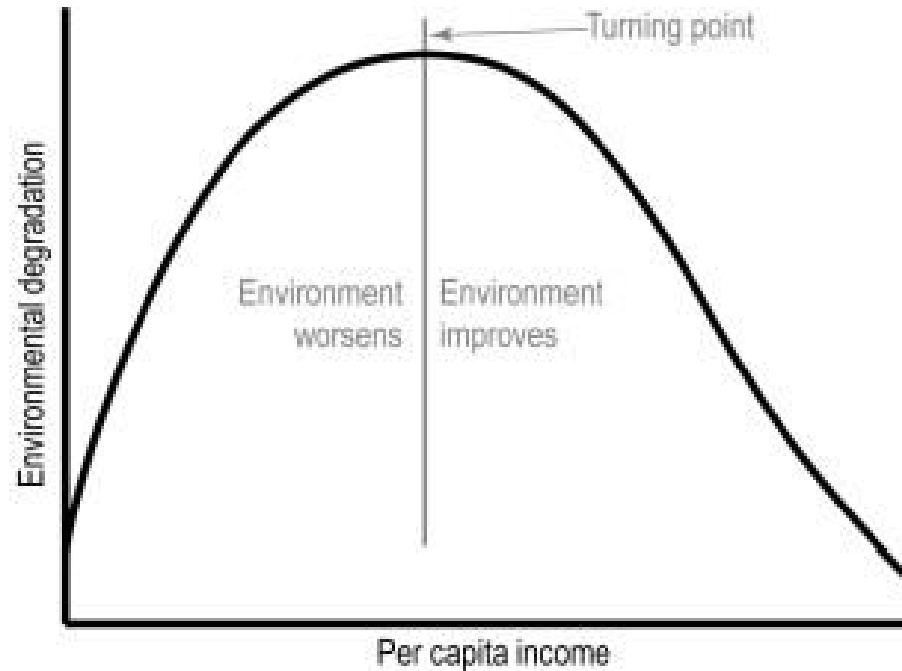
- Problem of externalities:
  - Market transactions do not include costs of environmental damage
  - Do not consider this in their production and consumption decisions
  - Examples:
    - I drive my car which causes pollution. Costs of pollution borne by everyone
    - Factory emits CO<sub>2</sub> when producing cars but environmental damage from this is not one of its costs
- Problem is essentially that nobody ‘owns’ the environment – it is a common

- Pollution
  - Costs?
    - Global warming
    - Respiratory disorders, etc
- Over-harvesting
  - Some resources renewable (water, fish stocks, trees)
  - Humans have a tendency to take at a faster rate than these resources renew!

## Is it getting worse?

- The basic economic problem: wants unlimited, resources scarce
- As economies grow, we are using more resources
- Example: Growth in China: 544 new coal fired power stations (BBC, 2005)
- .....but is it all bad news?

# Environmental Kuznets Curve



Alas, empirical evidence weak

# So what is the solution?

1. Stop producing
  - But we want to eat, have clothes and other goods, drive cars, etc
  - ⇒ In most cases there is an ‘optimal’ amount of pollution
2. Restrict the emissions that can be released (quotas/standards) / Encourage new technologies (subsidies or ‘direct action’)
3. Price the damage from pollution
  - Carbon taxes
  - Emissions trading

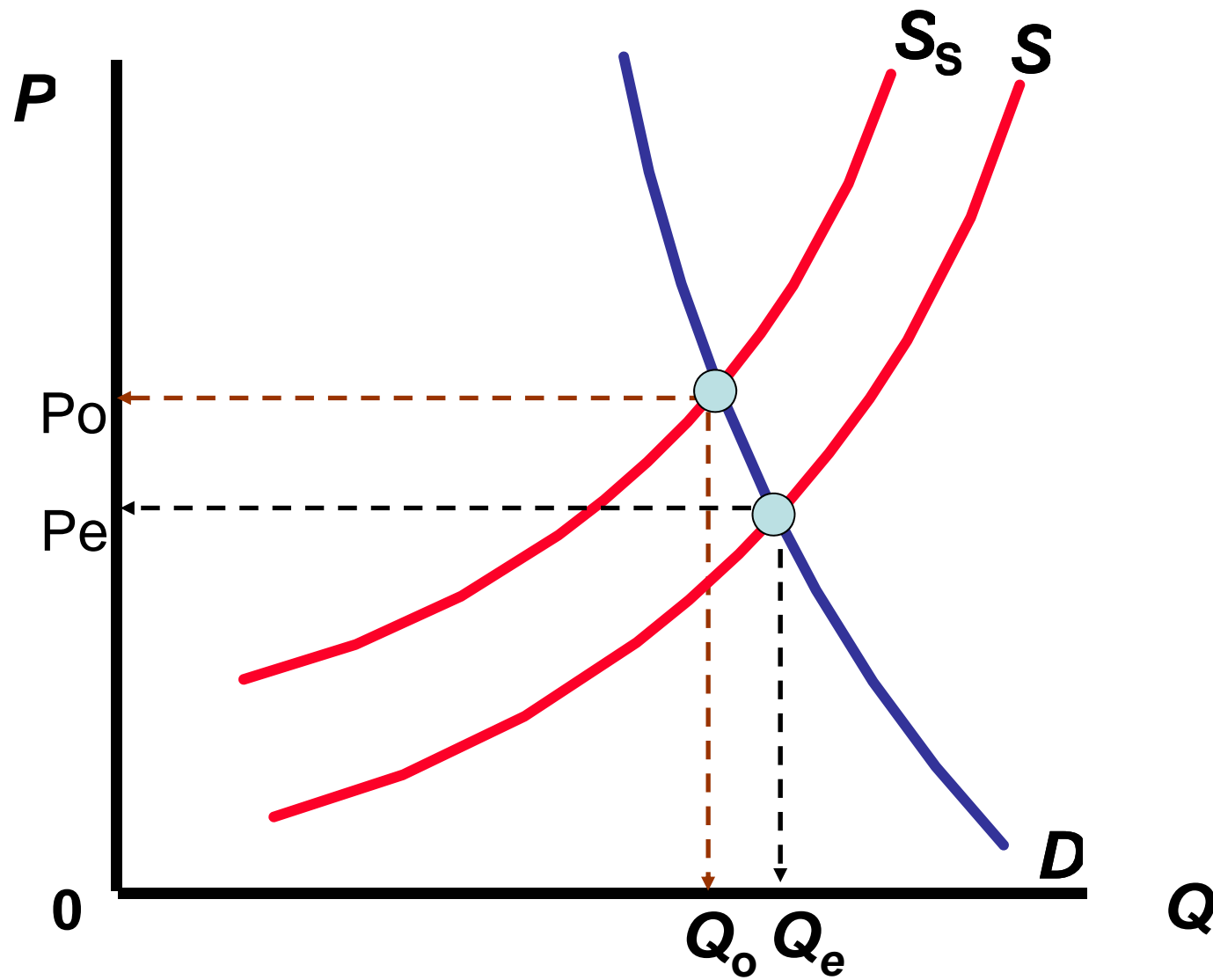
- New energy sources take large amount of R&D expenditure
  - Uncertain commercial viability
  - Private enterprises reluctant to invest
    - ...but may be public benefit from development, hence subsidies may have a place
- Problem of which ones to subsidise? Who chooses the winners?

- Idea is to restrict the quantity of the damaging activity
  - Limit the harvest of trees from the Amazonian rainforest / Bag limits on fish taken (quotas)
  - May be hard to enforce
    - Eg. 80% of deforestation of Amazonian Rainforests results from illegal harvesting (World Bank, 1999)
  - Mandate emission reducing technology (standards)
- Advantage: can set target levels with some degree of certainty

- The whole problem is that polluters and consumers do not pay for environmental damage
  - Costs are external
- Can be ‘internalised’ by taxes (eg emissions tax)
- Provides price incentives for firms to change behaviours
- Generally more efficient than direct action (lowest cost way of abating environmental damage)

- Under a tax, set tax rate to try and get a pollution reduction
  - The ultimate ↓pollution may be hard to estimate
- Emissions trading:
  1. Set desired pollution level (or number of fish caught, etc)
  2. Issue permits to pollute up to limit
  3. Let trading in the market determine the price
- All of the benefits of a tax with less uncertainty over pollution (in theory!)

# Externality in production



# Summary

- Environmental problems not new (and will not disappear in the future)
- Economics can help in explaining how these problems arise
- Economics can help with creating an environment which fosters the cheapest and best solutions
- Standards, subsidies, and pricing all have a role
- Pricing perhaps the most important.  
Environmental problems arose because of 'incorrect pricing'. Correcting this provides incentives for creativity and low cost abatement of pollution