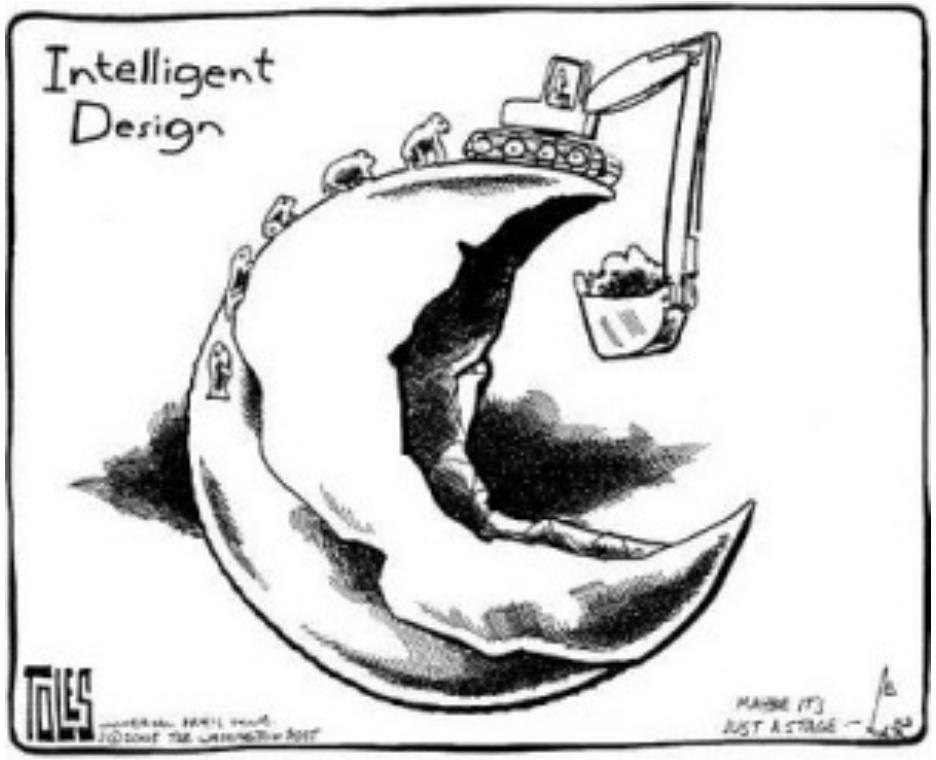
International Trade and Environment



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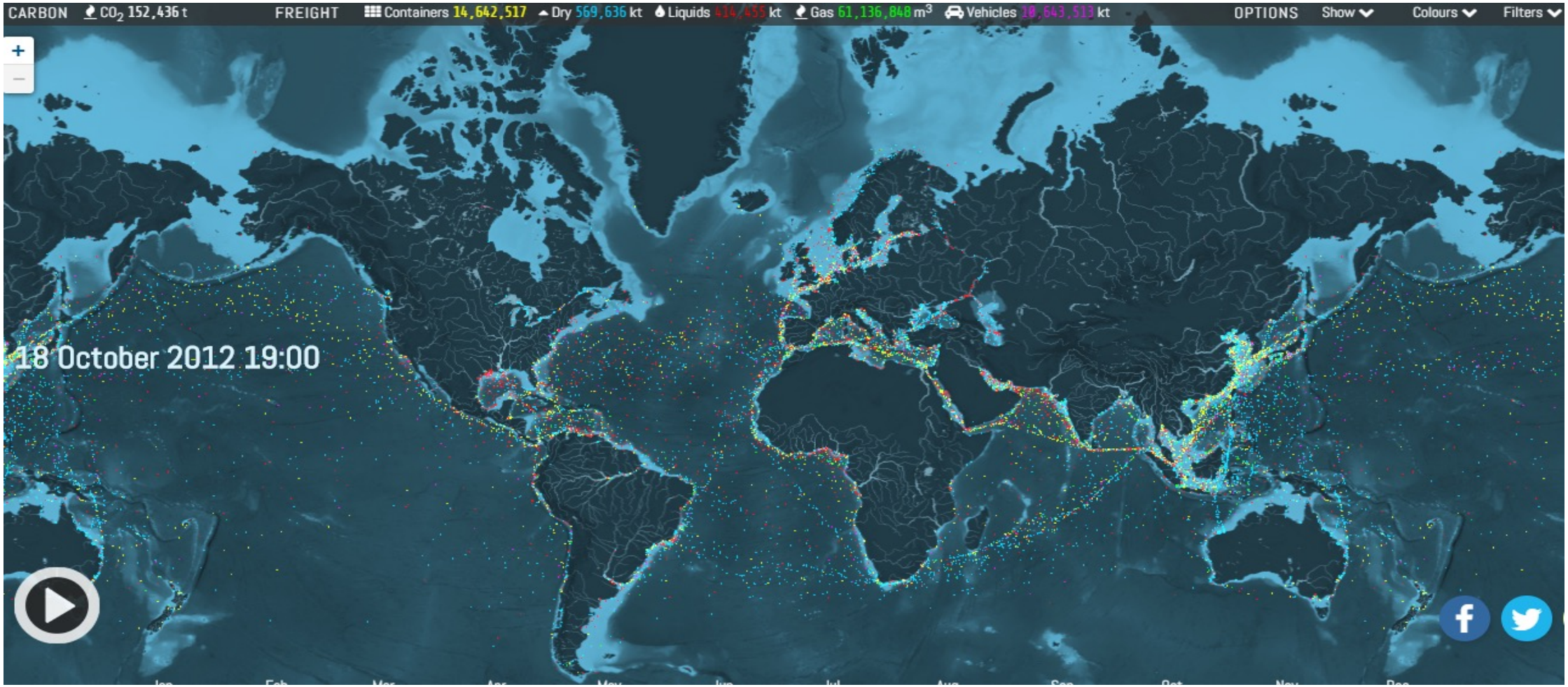
CARBON
CO_2 152,436 t
FREIGHT
Containers 14,642,517
Dry 569,636 kt
Liquids 414,455 kt
Gas 61,136,848 m^3
Vehicles 10,643,513 kt
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18 October 2012 19:00

Is trade good or bad for the environment?

Free trade proponents argue that free trade have a positive impact on the environment because after liberalization countries will

- produce goods in which they have a competitive advantage and have greater income due to trade liberalization.
- promote more efficient production and tend to reduce materials and energy use per unit of output.
- facilitate the spread of environmentally friendly technology.
- In addition, trading nations may come under pressure to improve environmental standards when product quality or transboundary impacts are at issue. (e.g. CBAM):

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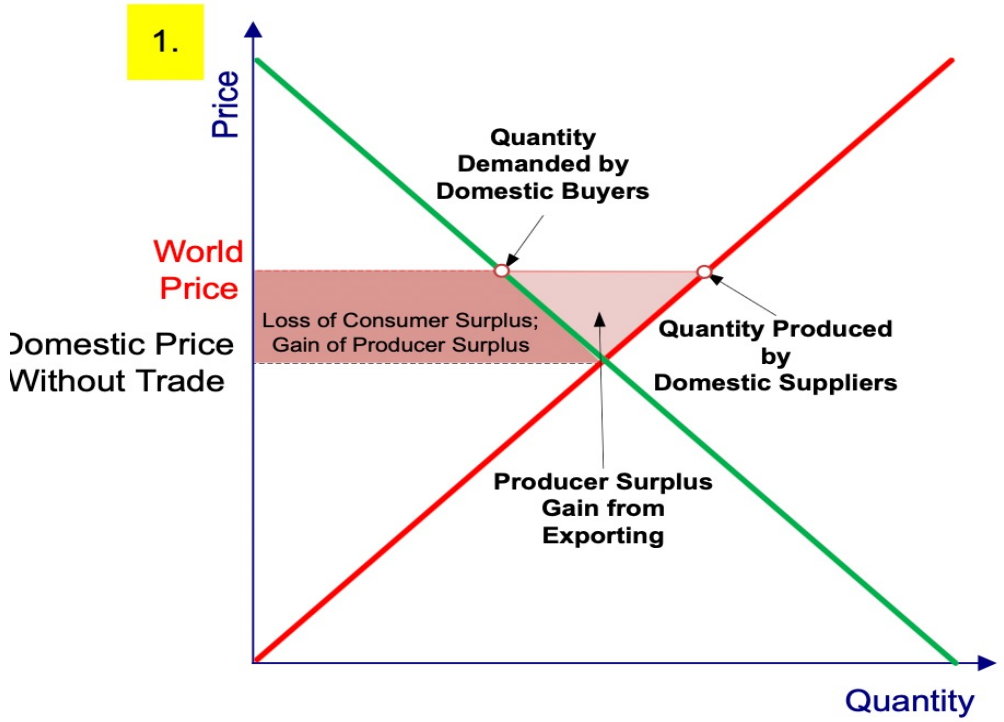
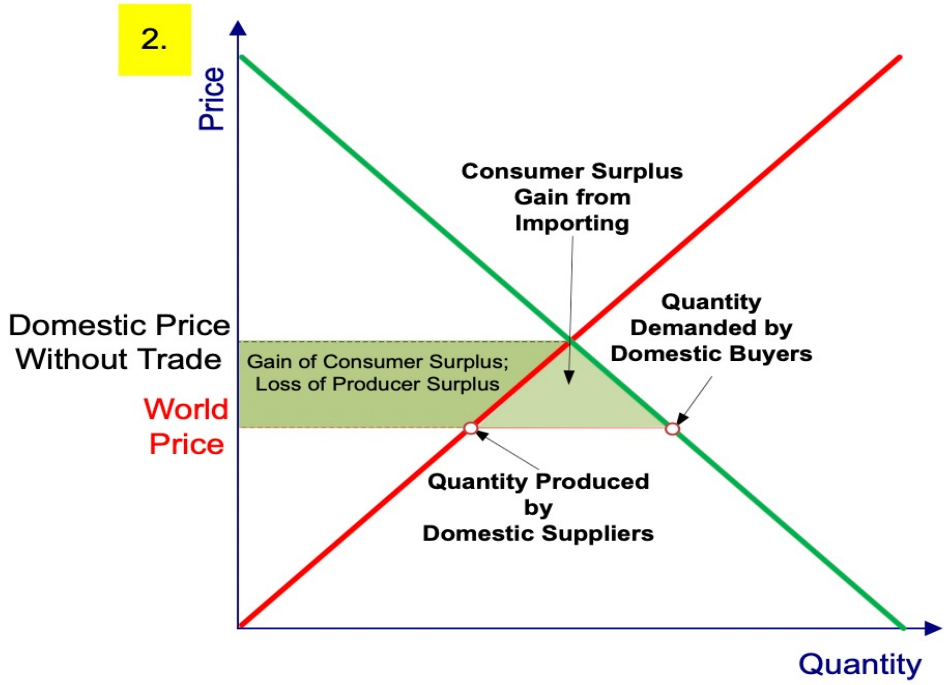
On the other hand, environmentalists argue that trade liberalization is detrimental for the environment because it will

- increase the scale of production for the world as a whole, meaning that the total volume of pollution and environmental damage is likely to increase
- expand more polluting industries.
- Specific kinds of trade, such as trade in toxic wastes or endangered species, have obvious environmental impacts.
- Trade also necessarily involves energy use for transportation, with resulting air pollution and other environmental impacts.
- encourage more polluting industries to locate in countries with lax environmental regulations. (“pollution heaven”)

International trade

- The theory of **comparative advantage** tells us that both trading partners **gain from trade** through specializing in the goods that they can produce most efficiently.





- But this basic theory does not consider environmental **externalities** that may be associated with the production or consumption of goods.

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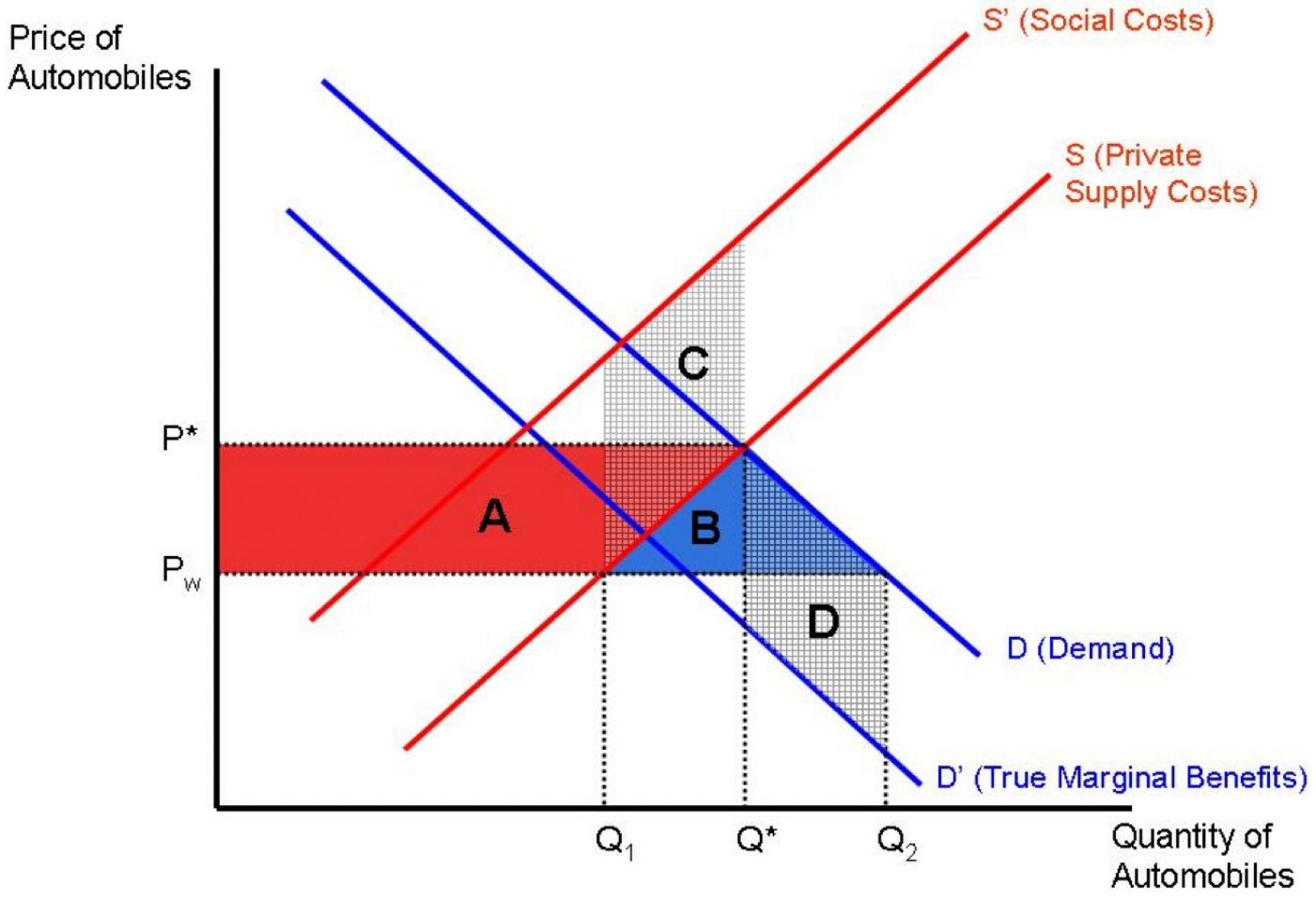

- The supply curve S takes into account private costs, whereas S' shows social costs including both private costs and externalities.
- P* is the domestic price in the absence of trade, whereas P_w is the world price, which will also be the domestic price under conditions of free trade.
- Q* is the quantity produced domestically with no trade, while with free trade Q_1 is produced domestically and (Q_2 - Q_1) is imported, for a total domestic consumption of Q_2.

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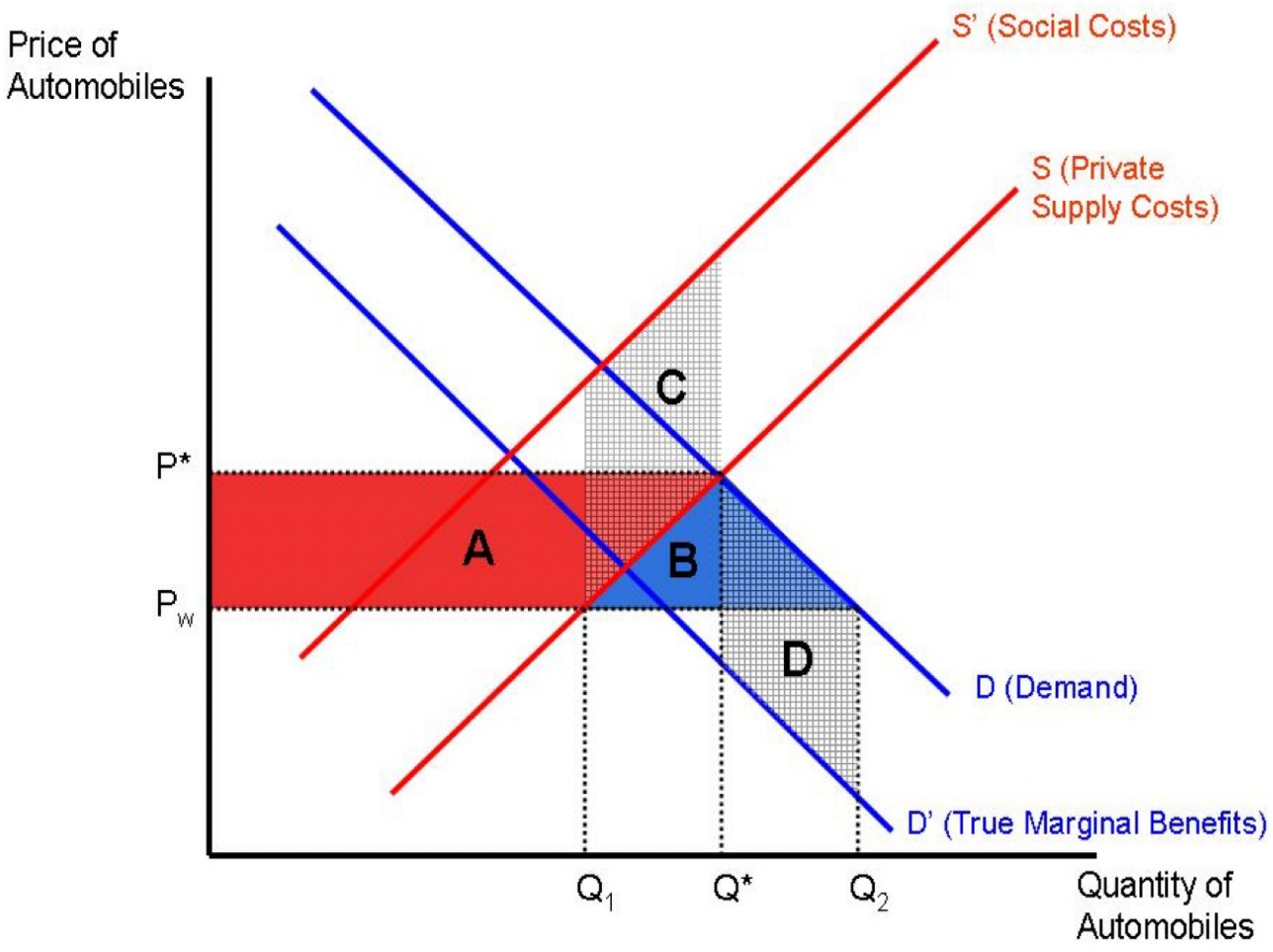


- How does trade affect domestic economic welfare?
- Domestic producers of automobiles lose the shaded area A, since they now sell fewer cars at a lower price. Domestic consumers gain areas A+B, since they can now buy more cars at the same lower price. The net gain from trade is therefore (A+B) - A = B.
- But this leaves out any environmental externalities associated with trade. If the production of automobiles causes environmental damage, then by lowering production the country gains gray area C in reduced environmental costs
- On the other hand, if environmental damage is associated with the consumption and use of automobiles, lowering the true marginal benefits from consumption, then trade increases the environmental costs of consumption by the shaded area D.

The Heckscher-Ohlin theorem

The Heckscher-Ohlin theorem suggests that trade is determined by differences in factor endowments.

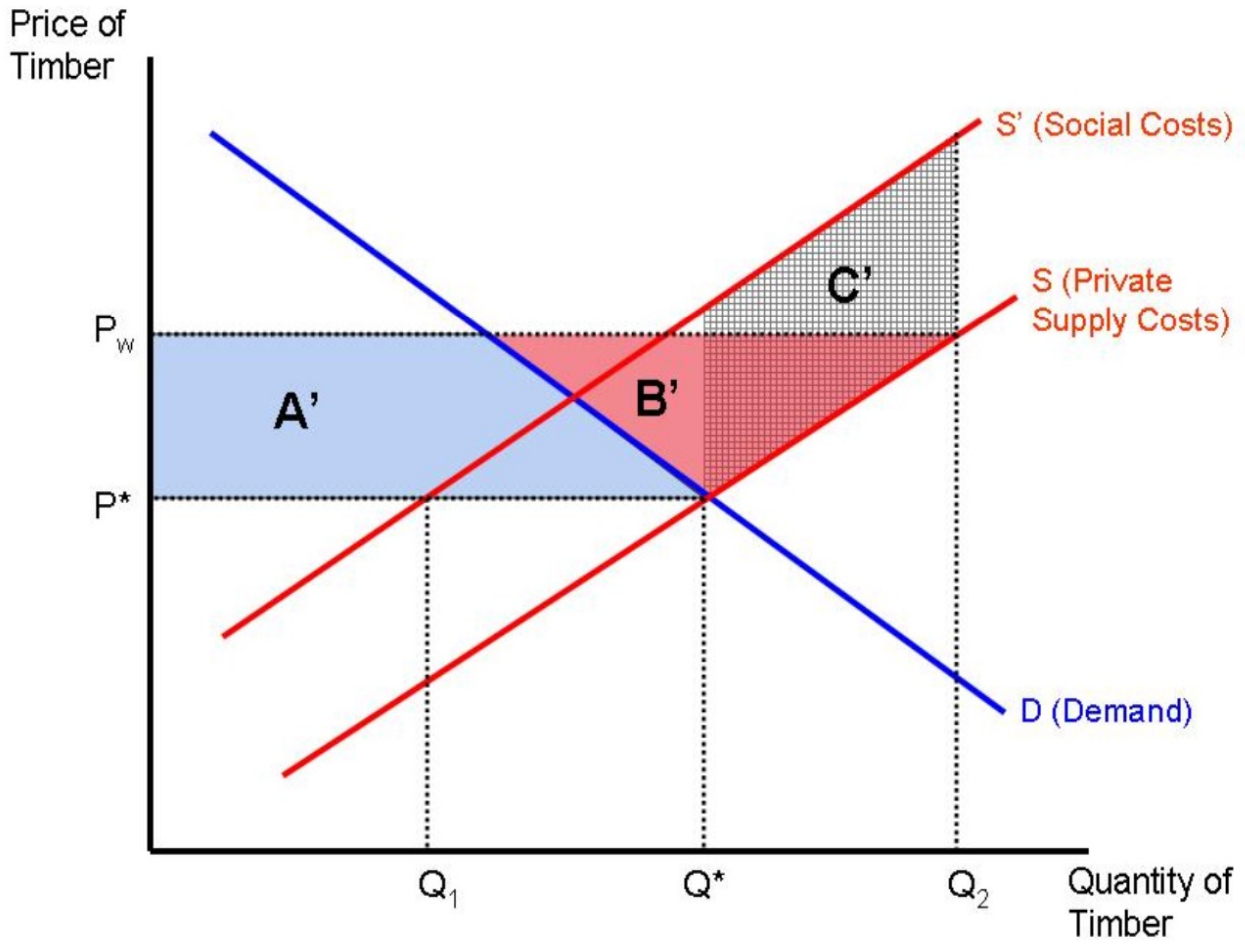
A country will

- export those goods relatively intensive in its abundant factor of production and
- import those goods relatively intensive in its scarce factor of production.

The Heckscher-Ohlin theorem

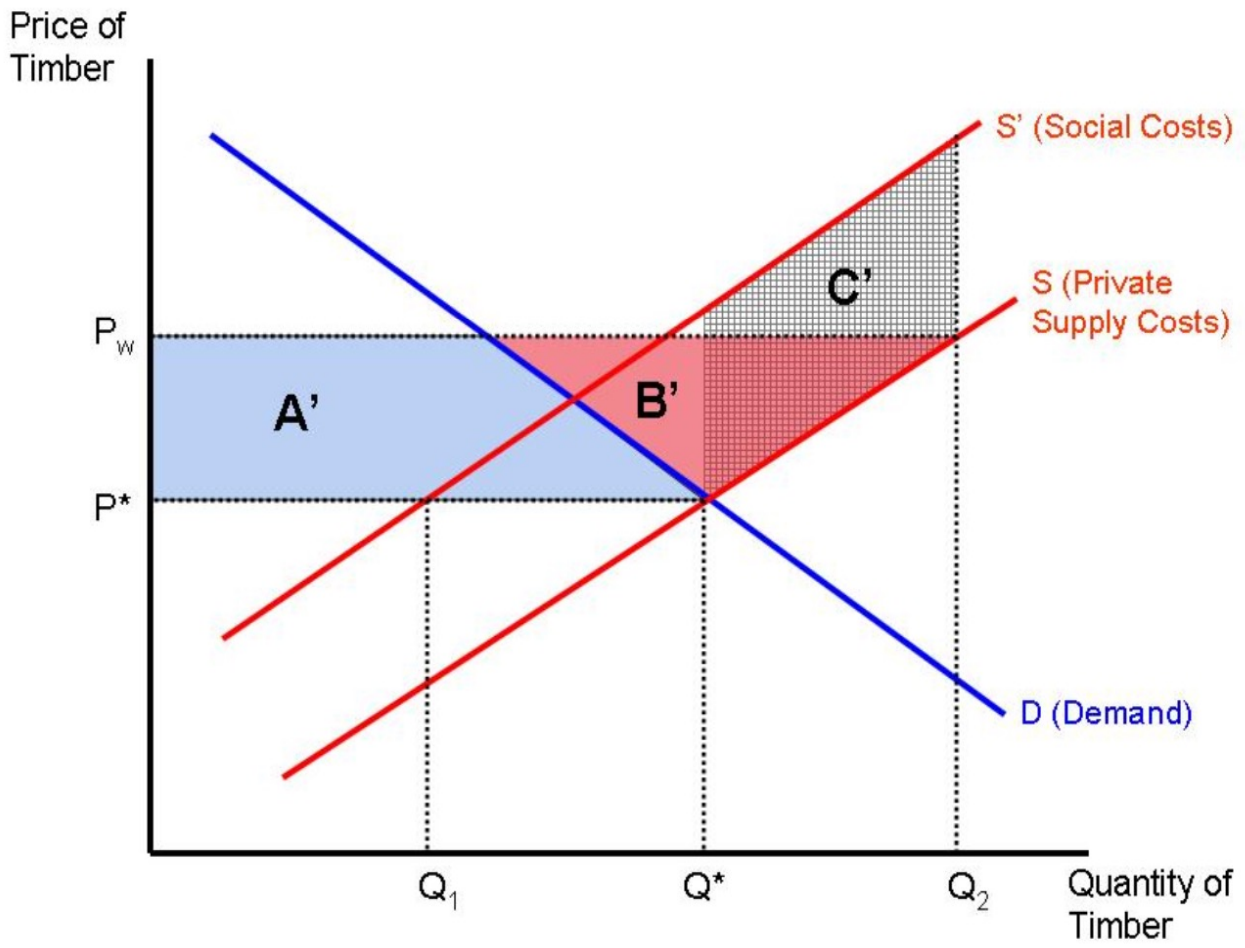
- For example, a country having an abundant supply of capital will find it cheaper to manufacture goods whose production is capital intensive.
    - The country is said to have a ‘comparative advantage’ in the production of such goods.
- HO theorem implies that countries well endowed with environmental resources should specialise on the production of environmentally damaging goods.

Environmental Effects of Expanding Resource Exports



- Environmental effects must also be figured into the analysis of the effects of trade on an exporting country.
- In the ordinary analysis of trade without externalities, timber producers gain areas A'+B' since with trade they can produce and sell more timber, at the higher world price P_w.
- Domestic consumers of timber lose A', being able to afford less timber at the higher world price. The net gain to the country is B'.

Environmental Effects of Expanding Resource Exports



- The external costs associated with higher timber production – which could include land and watershed degradation as well as ecological costs – are shown by the area of C'.
- We cannot tell for sure how B' and C' compare in size. Thus we cannot say unambiguously that there are net benefits from trade to this exporting country.
- In more commonsense terms, it is not clear that the economic benefits of increased exports outweigh the environmental damage associated with expanded logging.

Trade and Environment
Scale, composition and technique effects:
Environmental Impacts of a North American Free Trade Agreement
Grossman and Krueger (1993)

- G & K give a useful decomposition for thinking about the reasons underlying changes in emissions.
- Emissions are by definition equal to the overall scale of activity S, multiplied by the share of dirty goods in total output σ, multiplied by the emissions per unit of the dirty good, e.

$$Z = S\sigma e$$

- Taking logarithms and then totally differentiating this expression gives

$$\frac{dZ}{Z} = \frac{dS}{S} + \frac{d\sigma}{\sigma} + \frac{de}{e}$$

This says that the percentage change in emissions is equal to the percentage change in the scale of output plus the percentage change in the share of the dirty commodity plus the percentage change in emissions intensity of the dirty commodity.

Scale, composition and technique.

- **scale effect (-)** captures the change in aggregate pollution emissions due to changes in the level of economic activity.
- **composition effect (+/-)** captures the change in pollution resulting from changes in the composition of production across industries.
  - If a country enjoys a relative abundance of the environmental factor of production then that country will increasingly specialise in the production of environmentally intensive 'dirty' commodities.
  - Similarly, if a country possesses a relative abundance of capital then that country will specialise in the production of capital intensive commodities. In fact many goods are both capital intensive and environmentally intensive.
  - The overall effect of the composition effect on the environment is therefore ambiguous.

Scale, composition and technique.

- **technique effect (-)** the change in each industry's emission intensities. The technique effect captures the fall in pollution emissions coming from changes in the emission intensity of each industry through the importation of innovations embodied in both intermediate goods and capital goods (e.g. machinery or equipment used in the production of other goods and services) which a country could not have produced on its own and the transfer of knowledge about new production methods and design from developed countries.

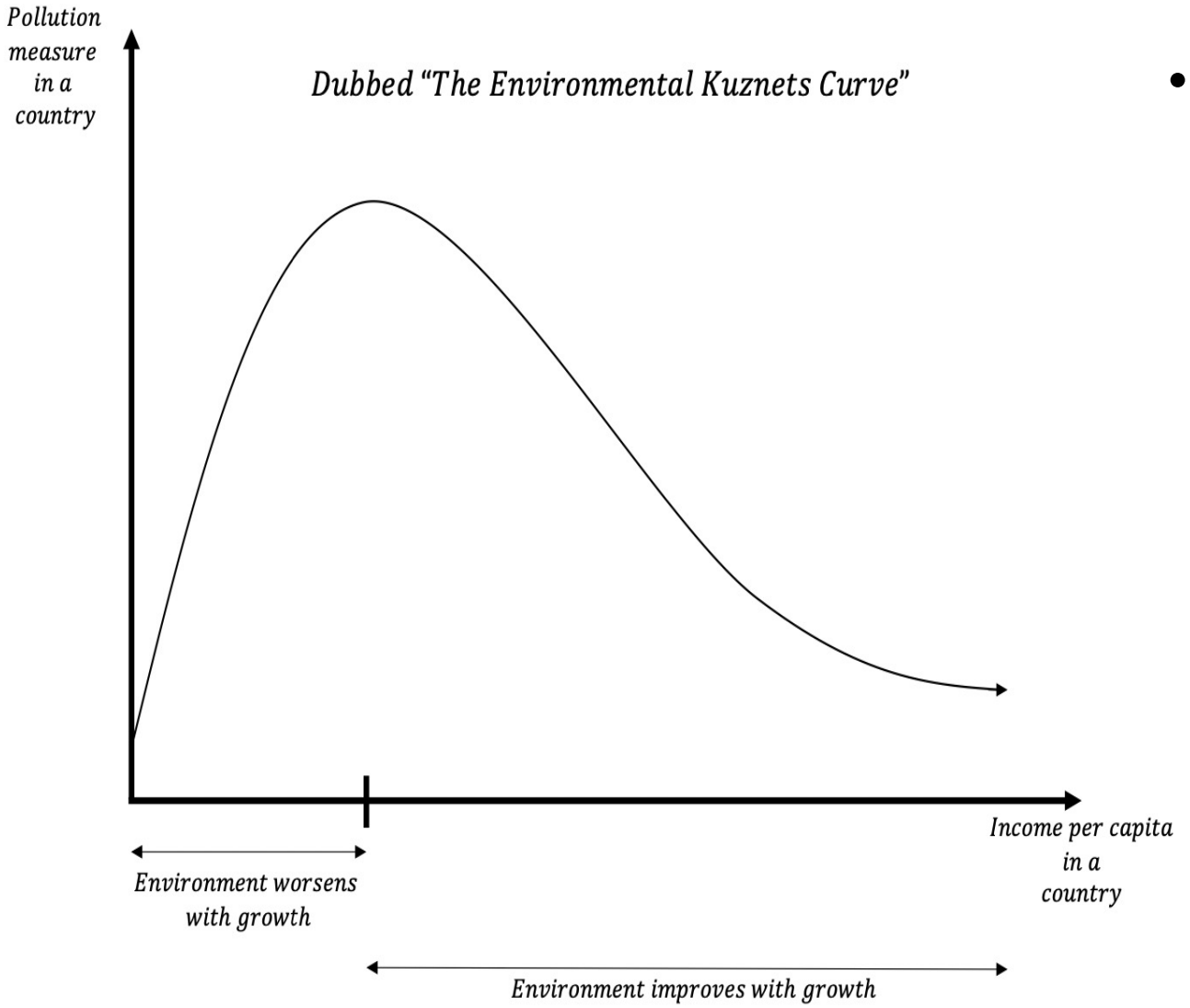


Figure 1: Environmental Kuznets Curve

- an inverted U shape, implying that:
  - Early stages of industrialization are linked to relatively high pollution levels when growth is a priority
  - environmental controls are lenient or nonexistent
  - More advanced economic development ➔ greater concern for environmental quality and a strengthening of environmental regulation