The Demand for Environmental Quality and the Environmental Kuznets Curve (EKC)

Question: How does income influence the demand for environmental protection?

Environmental quality is a <u>normal</u> good, i.e. as income increases the quantity demanded increases; it may also be a <u>luxury</u> good, i.e. as the income increases its demand increases more than proportionately (income elastic), but this is less clear. The <u>income elasticity of demand</u> for environmental quality turns out to be the key parameter which the answer to many important questions depend on, such as:

- As the world becomes wealthier, does environmental protection become more important or less important?

- Can differences in pollution levels among countries be explained by differences in income?

- Do poor people demand less environmental quality (protection) than the rich?

- Why do developing countries tend to have more lax environmental regulations than the rich countries?

- Is development the best instrument of environmental protection in poor countries?

- Will developing countries grow out of their current environmental problems?

- Why are all rich countries not equally clean and green?

How is private demand for environmental quality translated into environmental regulations?

STEP 1. The increase in income is translated into an increase in the individual demand for environmental quality.

STEP 2. The individual demands are translated (aggregated) into a societal or aggregate demand for environmental quality.

STEP 3. The aggregate demand on the part of the people is translated into demand on the part of the government.

STEP 4. The government demand is then translated into environmental regulations that aim to control pollution and to enhance environmental amenities.

Measuring the effect of income changes on environmental quality (EQ) is complicated by the fact that the observed EQ is the result of interaction of supply and demand, both of which shift with income increases:
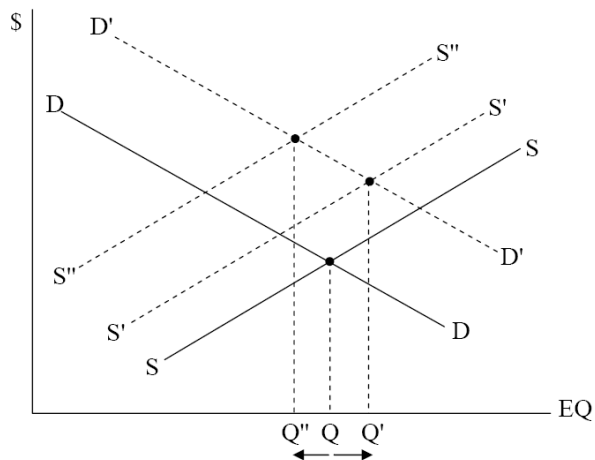

Depending on how much the supply curve has shifted, the increase in income might result in an increase or decrease in the equilibrium levels of environmental quality even though the demand (or WTP for environmental quality) has increased (an unambiguous income effect holding everything else constant).

**Question: Why is an increase in income causing a shift in the supply or MC function?**

Answer: The same forces that cause income to increase for the consumer may also change the supply conditions for the polluting firm; for example, a larger industrial base may increase the MC of providing a given level of environmental quality. It may also lower these costs through technological and institutional innovation.

Different pollutants exhibit different relationships to increases in per capita income.
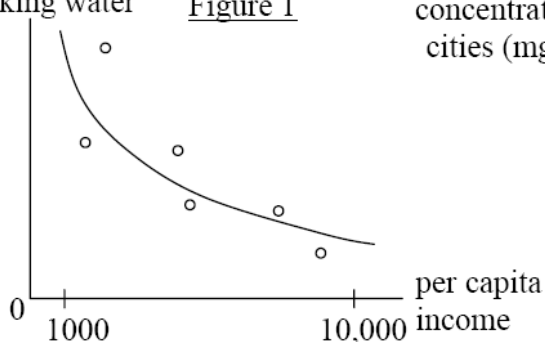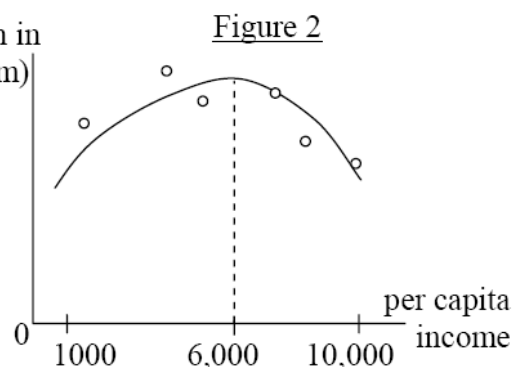
The income-environmental quality relationship which has the *shape of an inverted-U* is known as the Environmental Kuznets Curve (EKC) because of its similarity with the income-inequality relationship proposed by Kuznets. The EKC shows how environmental quality or pollution changes with increases in income in a country: environmental gets worse in the early stages of growth, but eventually reaches a peak and starts declining as income passes a threshold level.

The EKC is usually estimated with cross-section data for many countries at different levels of development at the same point in time and interpreted as showing what will happen to EQ in a country over time as it develops (as income rises). This is not entirely correct because of left-out variables which correlate with income levels: e.g. poor countries tend to be more densely populated; higher population densities may result in lower assimilative capacity of the environment, and higher costs of pollution control. Therefore, it is not reasonable to expect developing countries to follow the same path as they develop as today's wealthier but less-densely populated countries.

Another example is international trade. Today, developing countries operate in a globalized economy with freer movement of goods and capital across borders (though less free movement of labour); on the other hand poor countries may not have yet-poorer countries to which to shift their more polluting industries as they get rich (pollution haven hypothesis, PHH). Whether this really happens is not sure, but if PHH is valid, then today's developing countries may not be able to follow the experience of the developed countries.

Policy implications
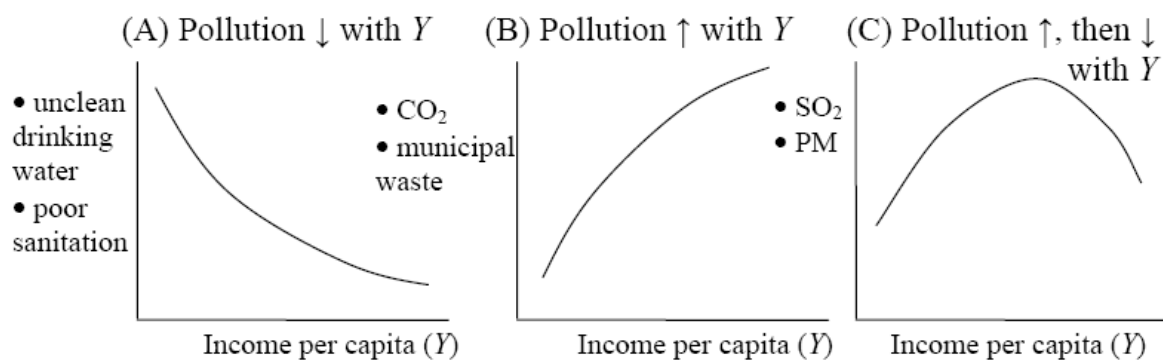
- If the curve has the shape of figure (A), then international environmental assistance to developing countries should focus on raising incomes (development).

- If the curve has the shape of figure (B), international environmental assistance to developing countries should focus on technology transfer and institutional innovation to reduce pollution.

- If the curve has the shape of figure (C) then the question is, when does the <u>turning point</u> occur, and at what level of income – that is, how long do we have to wait for things to get better? In the meanwhile, we need to do something about the increasing damage as things get worse before they get better. Moreover, will things get better <u>automatically</u> once income rises, or is a supportive policy needed also?