

ENVIRONMENTAL KUZNETS CURVES
14.42 LECTURE PLAN 11: MARCH 31, 2011
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PASTURE 1: EMPIRICAL RESULTS

Question: How have you seen the EKC where you're from?

- Los Angeles vignette

Question: How would you test this formally?

- Grossman and Krueger: examine data on a panel of countries.

Should we prefer panel or cross-sectional identification?

- Unobserved differences in cross-section. E.g. Population densities: middle-income countries have high pollution simply because they are densely populated, not because they are middle-income.
- Possible problem with cross-section: there may not be a common EKC. This adds noise, but the pattern should still show up in the data – we're estimating an average EKC.

Question: For what types of pollutants do we see EKCs?

- SO₂, river pollution, lead, etc. Pollutants with local marginal damages.

Question: For what types of pollutants do we not see EKCs?

- Carbon and other global public goods.
- What about natural resources? There may be a technique effect, but it seems to be outweighed by the scale effect (in the case of energy at least).
- Question: Are there any where pollution just declines in income?
 - Answer: No – it's just that the data don't have low enough levels of income to see the beginning upward swing.

Takeaways:

- Economic growth need not mechanically cause environmental degradation

PASTURE 2: CAUSES

Question: What are the most likely causes of the EKC?

- Regulation (technique effect)
- Sources of growth: agrarian to industrial to service. (composition effect)
 - Does this mean that we're exporting pollution to poor countries? Is this a worry?
 - Depends on whether they have a true lower marginal damage (i.e. comparative advantage in pollution)
 - Would mean that the EKC we've seen so far is not sustainable.

- Threshold effects: fixed cost to regulation
- Increasing returns to abatement
- My theory: changes in regulatory capacity associated with income growth.

Formalization: How income shifts supply and demand for environmental quality
(Figure 20.1 from Kolstad)

Question: Is there also an income effect on how close we get to the optimum.

Formalization: Scale, Composition, and Technique Effects

See ppt slide

- Question: Give an example of each effect.
- How do these play out in the causes we discussed?

Question: Consider the SO₂ EKC from Grossman and Krueger. Should we expect that the trend in the future will be the same as the trend we see from past data?

Push question: What does it mean that California, in the video, had to do research to discover what was going on and invent new technological solutions?

Answer: Other countries can appropriate that knowledge! This suggests that in the future, pollution will drop faster with income growth.

Alternative push question: What if the previous EKCs were driven primarily by composition effects, i.e. offshoring dirty industries to poor countries?

Answer: The poorest countries cannot further offshore those dirty industries to any other countries. So in the future, pollution will drop slower with income growth.

Question: How does opening up to international trade affect pollution through the scale, composition, and technique effects?

- Scale: we think trade may speed growth.
- Technique: technology transfer?
- Composition: Factor Endowment Hypothesis. Depends on comparative advantage: in clean or dirty industries. If we think capital-intensity means pollution intensity and developing countries are more capital intensive while developed countries are more human-capital intensive, then we might think that free trade increases pollution in developing countries. (China story.)
 - But you could tell the opposite: developed countries are more capital intensive and developing are labor intensive: Bangladesh story.
 - May shift to dirtier industries due to Pollution Haven Hypothesis.
 - Limited evidence for this.
 - Would this shift be optimal? Could very well be, unless pollution control regs in developing countries are weak.

Takeaways:

- Can break down income effects into scale, composition, and technique effects.

PASTURE 3: POLICY IMPLICATIONS

Question: What are the policy implications?

From the perspective of regulators in the country

Question: Is this optimal?

Answer: Come down very hard on the idea that the empirical facts do not say anything about what's optimal. Keep the supply and demand for environmental quality graph up.

From the perspective of an international NGO/World Bank

Question: Kolstad vs. Grossman and Krueger. Who do you believe?

Answer: Come down very hard in favor of needing regulation, and outside pressure perhaps driving regulation.

Why? Several papers that analyzed scale, comp, and technique effects found importance of technique effects instead of composition, which were likely driven by policy: Selden, Forest, and Lockhart (1999) on US industrial air pollution emissions from 1970-1990. Hettige, Mani, and Wheeler (2000) on water pollution from manufacturing from 12 countries. Hilton and Levinson (1988) on lead emissions using 48 countries over 1972-1992.

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